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An Experimental Study of the Relation of Hydrogen Ion Concentrations to the Formation of Floc in Alum Solutions.

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In approaching a scientific analysis of the art of water clarification it seems to us essential to distinguish the several aspects of the subject. These are so integrated in actual plant operation that it is difficult to perceive the true importance of each of the several factors which have to be mastered by the operator under every exigency. The isolation of phenomena, and their exact quantitative evaluation, will alone permit a true appraisal of any factor in relation to the process as a whole.

We have limited our attention to certain laboratory experiments which clarify one distinct aspect of the alum process. Our data doubtless lack the scope desirable for general practical application, but they indicate that, unless factors still to be investigated have an unexpected influence, maximum precipitation of added aluminium will occur within definite and narrow limits of hydrogen ion concentration.

It is well recognized that a precipitate is not formed from alum when the final solution is either too "acid" or too "alkaline." Hitherto the essential degree of "acidity" or "alkalinity" has been sought in the *quantity* of acid or alkali determined by one or another analytical method. More recently there has been a growing appreciation of the fact that the waterworks operator is dealing with reversible reactions, that his task is to control equilibria, and that all too often the methods of the analyst, devised originally for other purposes, upset an established equilibrium to yield information of dubious value to the case at hand.

There is little need to review here the relations which have been brought to light in studies of equilibria among acids and bases. They have been emphasized frequently and summarized in various treatises. However, we shall preface our contribution by a brief discussion of a set of equilibria pertinent to the subject.

It has frequently been emphasized that the construction of a titration curve may show the salient characteristics of an acid, a base, or an amphotelyte. It is therefore interesting to approach the

problem first by a consideration of the titration curve of an aluminium salt.

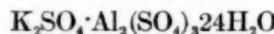
In Figure 1 are shown two such curves. These were constructed from the data obtained when known concentrations of potassium alum were titrated with sodium hydroxide solutions and the hydrogen ion concentration was measured after each addition of alkali.

For the determination of hydrogen ion concentration, the electrometric method was used. The potentiometric system consisted of a Leeds and Northrup type K potentiometer and type R galvanometer with properly shielded switchboard and wiring. The Weston cell values were certified by the Bureau of Standards. The calomel half-cells used as working standards were compared with a battery of tenth normal KCl calomel half-cells and the system was brought to the standard recommended in "The Determination of Hydrogen Ions" (Clark, 1920).

The hydrogen used was electrolytic hydrogen supplied in tanks. It was passed over heated platinized asbestos and then over soda-lime, and wherever possible was led through copper tubing rather than rubber tubing.

Since very dilute solutions were to be dealt with in some of the experiments, it was considered of more importance to guard the solution from atmospheric contamination during handling than to take advantage of several features in Clark's electrode vessel. Therefore, instead of titrating aliquots and measuring each when separately transferred to the electrode vessel, continuous electrode measurements were carried out in Erlenmeyer vessels, into which were led the electrodes, the gas inlet and outlet, a gooseneck siphon from the saturated calomel half-cell, and a burette tip. The chief objection to this arrangement was in the narrow liquid junction—made narrow to prevent too great contamination of the solution by the saturated KCl of the liquid junction and too great a loss of titrated material by the exchange. However, this inherent error was probably small and constant and displaces our curves in no essential respect. All titrations were made at constant temperature.

The alum solutions used in the titrations illustrated in Figure 1 were prepared from conductivity water, and a sample of



which had been recrystallized several times. Analysis by the procedure of Blum (1916) indicated 99.6 per cent, 100.1 per cent, and 100.1 per cent, or an average of 99.93 per cent of the theoretical amount of aluminium. Once prepared, this sample was carefully protected against change in moisture content.

The sodium hydroxide solution and the calcium hydroxide solutions used in other measurements were prepared from electrolytic

amalgams which were decomposed with boiled-out "conductivity" water. All operations were made with adequate protection against contamination by atmospheric CO₂.

In accordance with custom, we shall express hydrogen ion concentrations in terms of Sørensen's pH, which is defined by the relation

$$\text{pH} = \log \frac{1}{[\text{H}^+]}.$$

With the type of vessel used in these titrations, considerable time was necessary at the start to thoroughly displace oxygen and to establish equilibrium stable within a small part of a millivolt. Thereafter there was found evidence that the potentials obtained after each addition of alkali rapidly became indicative of a true *electrode* equilibrium. This conclusion rests on the following evidence: The same equipment rapidly gave equilibrium potentials with systems which do not change as does the aluminium system, and it furnished smooth titration curves on rapid titration of aluminium salts.

On the other hand, with mixtures of aluminium salts and alkali, there was noted a slow drift in potential which was not in all cases entirely orderly, but which had the characteristics indicated below.

Time in minutes after adding alkali (t.)	Log t.	Potential of chain.
1	0	.5138
3	.47	.5130
77	1.88	.5112
102	2.01	.5109
160	2.20	.5106
180	2.26	.5105

This, the smoothest relation found, shows, on graphic extrapolation, that if the drift had continued until the pH of the solution was altered 0.05 pH units it would have required about 166 hours. Generally, however, the drift was not so linear in relation to log t, but continued to decline at a continuously lower rate than that indicated above. Evidently such drifts would be overlooked by one using a cruder method of measurement. We believe them to be due to a slow shift in equilibria due to the properties of the solid phase.

In the more alkaline regions the drift was often of a serious nature, and the plotted curves can not be taken to indicate that complete equilibrium was approached in the solutions more alkaline than pH 7. The drift was of uncertain nature, and it is probably to be accounted for by the complexity of the processes occurring.

The "aluminium hydroxide" precipitated at the higher acidities is slowly redissolved on the addition of more alkali, and at the same time there is a tendency for the separation of the crystalline form of the hydroxide as noted by various observers. From this complex,

with its resulting effect on pH and, consequently, on the potential of the hydrogen electrode, about all we can do is to select values which we assume to be most nearly representative.

Assuming that studies at higher and lower temperatures might alter the drifts in potential in a way that might throw light upon the situation, we made measurements at 15° C. and 46° C. The titration

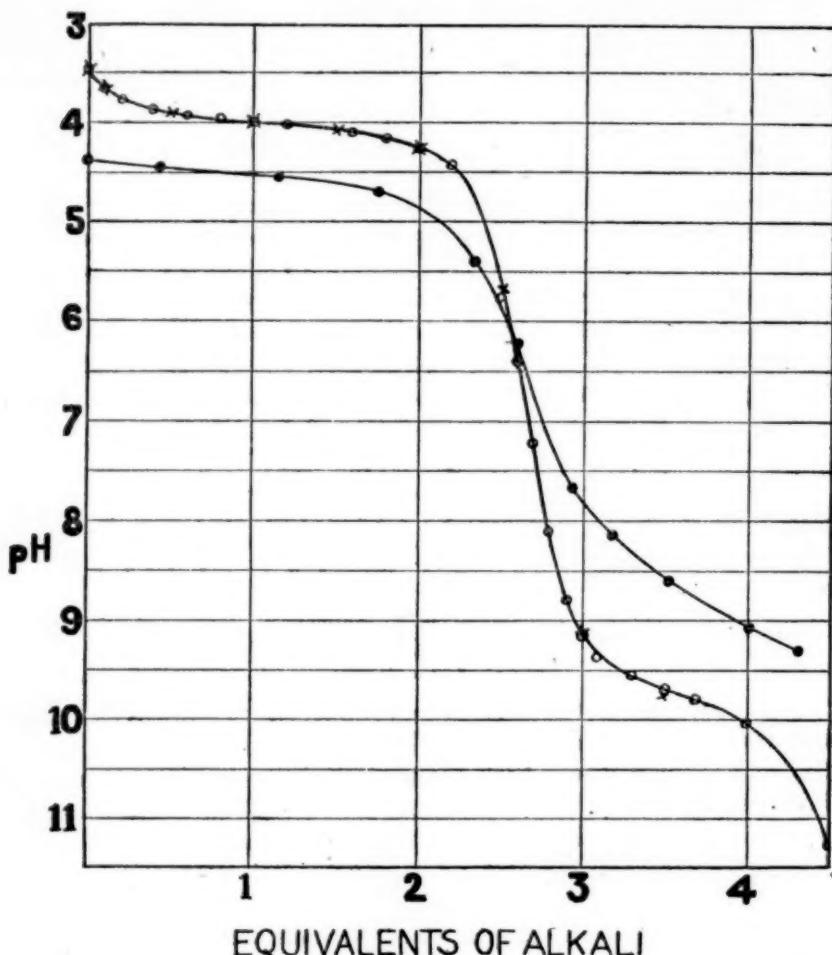


Fig. 1.—Titration curves showing the pH values of solutions of alum at successive stages of treatment with alkali.

curves at these temperatures, like those at 30° C., were fairly satisfactory at pH values less than 7.0, but the drifts in the alkaline regions were erratic and can not be interpreted with confidence.

It may be mentioned in passing that titrations were also made with calcium hydroxide. The titration curves with calcium hydroxide as a base were, in the more acid regions, identical with those made

February 2, 1923.

with sodium hydroxide, with the exception of very minor differences which are of no significance and which are of an order of magnitude attributable to experimental error. In the more alkaline regions the same difficulties mentioned above were encountered.

The points mentioned above do not affect in any very serious way the conclusion that the curves in Figure 1 represent the general trend of the titration process. In Figure 1 the curve marked by blackened circles represents the relation between pH (ordinates) and equivalents of added alkali (abscissæ) in the case of a solution 0.0002 molecular with respect to Al when titrated with NaOH solution at 30° C. Upon the other curve, the circles represent the data obtained in the titration with NaOH of a solution 0.02 molecular with respect to Al. The crosses represent a duplicate series of measurements. If these curves are compared with those published by Hildebrand (1913) and by Blum (1913-14), there will be found a general agreement in the main features. However, the measurements by Hildebrand and by Blum were made with comparatively crude instruments, and for this reason the observers probably hesitated to call attention to detailed features in the titration curve which must have appeared to them very peculiar. One notable feature is the distinct slope of the curve between pH 5 and 8. This certainly can not be due to the presence of a buffering impurity, such as bicarbonate, for our solutions were made with every precaution to exclude such impurities. The fact that the steeper part of the curve should occur so distinctly ahead of the three equivalents of alkali is also food for thought. The flatness of the curve at the start is, of course, accounted for by the throwing out of one or more constituents of the equilibrium as the titration proceeds.

In several papers published on the subject it has been assumed that the isoelectric point could be determined by mere inspection of the titration curve and the selection of the middle point in the steep part of the curve. This assumption was based on a procedure legitimate for the approximate determination of isoelectric points when there is symmetry in the number of acidic and basic dissociations and complete solubility of material concerned in the equilibrium equations. None of these conditions has been shown to apply to the case at hand.

In the titration of poly acids or bases it is usually found that the titration curve exhibits the several steps of neutralization. Even when the dissociation constants are close together, a distinct inflection of the titration curve can usually be discerned. In the case at hand, there is but one inflection, and this may be considered to be between the region of acidic dissociation and the region of basic dissociation. It would, therefore, seem legitimate to neglect a distinction between

the first, second, and third basic dissociations and to consider them together. Thus if we have—

$$\frac{[\text{Al}^+(\text{OH})_2][\text{OH}^-]}{\text{Al}(\text{OH})_3} = K_{b1} \quad \dots \quad (1)$$

$$\frac{[\text{Al}^{++}(\text{OH})][\text{OH}^{-}]}{[\text{Al}^{+}(\text{OH})_2]} = K_{b2} \quad \dots \quad (2)$$

and

$$\frac{[\text{Al}^{+++}][\text{OH}^-]}{[\text{Al}^{+++}(\text{OH})]} = K_{b_3} \quad \dots \quad (3)$$

it is easily shown that

$$\frac{[\text{Al}^{+++}][\text{OH}^-]^3}{[\text{Al}(\text{OH})_3]} = K_{b1} K_{b2} K_{b3} = K_b \dots \dots \dots \quad (4)$$

The use of equation (4) and the assumption of low solubility for Al(OH)_3 would lead to a theoretical curve similar in its general form to the upper portions of the curves shown in Figure 1. Incidentally, the low solubility of Al(OH)_3 will contribute very markedly to the position of the curve on the pH axis so that such a curve can not be directly compared with those curves used to depict equilibrium conditions when all components are soluble. By the same token the presence of *any* insoluble component would greatly modify the classic type curve and give it the general form of the experimental curve. Therefore we are not justified in using equation (4) as alone representative of *actual* conditions. Without committing ourselves at all to the assumption of the reality of particular modes of ionization, but merely to deal with convenient formulas, let us assume the ionizations which are involved in the following equilibrium equations:

Acidic dissociation:

$$\frac{[\text{Al} - \text{O} - (\text{OH})_2] [\text{H}^+]}{[\text{Al}(\text{OH})_3]} = K_a \quad \dots \quad (5)$$

Basic dissociation:

$$\frac{[\text{Al}^{+++}] [\text{OH}]^3}{[\text{Al}(\text{OH})_3]} = K_b \quad \dots \quad (6)$$

If the solution is so dilute that the ionizations of all aluminium salts are *complete*, then the total aluminium will be the sum of the undissociated aluminium hydroxide, and each concentration of each ion. If, furthermore, the conditions are such that solid aluminium hydroxide is present in gram mols S, then the total aluminium, T, will be—

$$T = S + \text{soluble } [Al(OH)_3] + [Al(\bar{OH})_2O] + [Al^{+++}] \dots \dots \dots (7)$$

Substituting (5) and (6) and considering that at the equilibrium state [soluble Al(OH)_3] is a constant, C, we have—

$$T = S + C + \frac{K_a C}{[H^+]} + \frac{K_b C}{[OH^-]^3}$$

or since $[H^+] [OH^-] = K_w$

$$T = S + C + \frac{K_a C}{[H^+]} + \frac{K_b C [H^+]^3}{K_w^3} \quad \dots \dots \dots (8)$$

Recasting (8) and differentiating,

$$\frac{dS}{d[H^+]} = \frac{K_a C K_w^3 - 3 K_b C [H^+]^4}{K_w^3 [H^+]^2}.$$

There will be a minimum variation of solid with variation of

$$[H^+] \text{ when } \frac{dS}{d[H^+]} = 0.$$

This condition is fulfilled when

$$[H^+] = \sqrt[4]{\frac{K_a C K_w^3}{3 K_b C}} \quad \dots \dots \dots (9)$$

But $K_a C$ is the solubility product K_{as} , and $K_b C$ is the solubility product K_{bs} . Therefore

$$[H^+] = \sqrt[4]{\frac{K_{as} K_w^3}{3 K_{bs}}} \quad \dots \dots \dots (10)$$

We know from the graphic expression of relations that $\frac{dS}{d[H^+]}$ passes from positive to negative in passing the isoelectric point. Therefore S is a maximum at the isoelectric point. To show that $[H^+]$ in (10) is the isoelectric point, that point at which there is electrical equivalence of positively and negatively charged aluminium ions, we proceed as follows: The condition to be fulfilled is

$$[\text{Al}(\bar{O}\text{H})_2\text{O}] = 3 [\text{Al}^{+++}] \quad \dots \dots \dots (11)$$

Substituting in (11) the relations of (5) and (6) we have

$$\frac{K_a [\text{Al(OH)}_3]}{[H^+]} = \frac{3 K_b [\text{Al(OH)}_3]}{[OH^-]^3}$$

Also

$$[H^+] [OH^-] = K_w$$

But $K_a [\text{Al(OH)}_3]$ and $K_b [\text{Al(OH)}_3]$ are the acid and base solubility products K_{as} and K_{bs} , respectively.

Substituting, we have

$$[\text{H}^+] = \sqrt[4]{\frac{K_{as} K_w}{3K_{bs}}}$$

This is identical with (10)

Now, Heyrovsky (1920) working at 25° C. has given for K_{as} and K_{bs} the values 35×10^{-14} and 1×10^{-33} , respectively. Using the more favorable of the experimental data obtained from our titration curves at 30° C., we find approximately $K_{as} = 1 \times 10^{-12}$ and $K_{bs} = 1 \times 10^{-32}$. Heyrovsky's values introduced into equation (10) give an isoelectric point of pH 5.49. Our values give pH 5.6. According to the assumptions, then, the isoelectric point should lie between pH 5.5 and 5.6. We place little confidence in the calculation, however, because on returning to the titration curves themselves we find that we are unable to account for several features of the curves when using the solubility products mentioned above.

Furthermore, it is found that by specifying ionizations other than those used in the elementary treatment given, we obtain a variety of equations which, upon the assumption of one or several components of small solubility, will reduce to a form giving essentially the same picture as that presented. Thus the equations we have given furnish a correct description of principles but tell nothing whatever of the actual components entering into the problem. This has become evident in our attempts to formulate the very distinct slopes of the experimental curves found between the addition of two and the addition of three equivalents of alkali. As will appear later, the pH values found on these slopes are of the very greatest importance in the practical application of alum-coagulation, and no makeshift explanation will suffice for the problem at hand. The intersection of the curves shown in Figure 1 is of undoubted significance, but attempts to find a relation between intersections at various dilutions have failed so far.

In short, then, we are presented with a problem of very great complexity, owing, undoubtedly, to the very low and consequently variable solubility of one or more components of the equilibrium state.

We have dwelt at some length upon this problem in order to indicate its general nature and to disarm those who, carrying over to the case at hand principles which furnish reliable data in other systems but which are inapplicable here, have assigned definite values to the isoelectric point. Inasmuch as a variation of 0.2 pH may have great practical significance, we shall need an accurate evaluation of the isoelectric point; and in the hope that future work will reveal it, we may now turn our attention to an indirect method of attack.

February 2, 1923.

EXPERIMENTS ON RATE OF FLOC FORMATION.

We may safely assume from analogy that in any homogeneous mixture of alum solution and alkaline water, the reversible reactions proceed almost instantaneously to a state of equilibrium which would remain unaltered were there no separation of solid material. On the other hand, it is a matter of experience that the passage of a precipitable material from invisible to visible aggregations often requires very considerable time. Undoubtedly one determining factor is the following: It has repeatedly been shown for liquid drops forming in a saturated atmosphere, for crystals and so-called amorphous precipitates separating from solution, that the small aggregates are less stable than the large, their material "distilling" over to, or at least having a preferential tendency to deposit upon, the larger aggregates. In the case of raindrops it can be shown by very simple thermodynamic reasoning that the vapor pressure in equilibrium with a very small drop is greater than the vapor pressure in equilibrium with a larger drop. Therefore, a higher degree of saturation must be required to form the first minute drops than the subsequent larger ones. The same reasoning can be applied to the formation of bubbles of gas from a solution of a gas in a liquid and to the formation of a solid aggregate from a solution of the solid in a liquid. In each case appreciable time is required for migration and orientation of the material entering into the aggregate.

Now, then, if all other conditions could be held constant while the degree of supersaturation of the separable material is varied, the rate of aggregation would be proportional to the concentration in the liquid phase of the separable material. In the case at hand we could vary the degree of supersaturation of the water with Al(OH)_3 (assuming this to be the precipitate) either by increasing the total alum added at a given final pH value or with constant aluminium by varying pH. Under the last condition the maximum should occur at the isoelectric point. Undoubtedly the experimental attainment of the condition that "all other conditions shall remain constant" is difficult, especially since we have very little detailed information upon the mechanism of a solid separating from solution. Nevertheless, with due reservation, we should expect minimum time of flocculation at the isoelectric point. As will be shown presently, we obtain experimentally a minimum time in a zone of pH within which we have found a provisional value for the isoelectric point.

It would be difficult, however, to formulate *a priori* the precise mathematical relations, because we know little quantitatively about the forces operating in the formation of precipitates. We prefer, therefore, to describe our experimental results and to leave them

formulated by means of empirical charts and equations which are sufficient to bring out the important features.

In the study of flocculation in waters it has sometimes been the custom to ascribe certain numbers to flocs of different character. This seems to us an irrational procedure, because, aside from the inherent difficulty in obtaining any mathematical relation between the qualities to which the numbers are assigned, the observer has to carry from experiment to experiment a very precise picture of several flocs to which he has ascribed numbers. If, however, the attention is fixed upon one state, as, for instance, the very first detectable formation of floc, the remainder of the measurement may be left to the impersonal accuracy of a stop watch. It is this method that we have employed, leaving all questions of the quality of floc to incidental notes. As we shall see, this was a fortunate choice of method. The experimental method followed will be briefly described.

A definite volume of a solution of known composition was treated with varying amounts of aluminium sulphate in dilute solution. After mixing as rapidly as possible, the liquid was poured into a 100 c. c. cylinder. To increase the visibility of the floc, the cylinder was *slightly* agitated whenever observations were made. The initial turbidity, the time required for the first appearance of a "floc," the character of the "floc," and its rate of settling and its abundance were noted. Caliometric pH measurements were made with the mixture. The temperature at which the experiments were conducted did not differ appreciably from 22° C.

Following this procedure, the entire range of pH values within which a "floc" can be expected was investigated. At first the solutions used were the ordinary buffer solutions of the usual strength. In order to approach more nearly to the buffer strength of natural waters, experiments were also made with buffer solutions at various degrees of dilution. Experiments were also made using solutions of sodium hydroxide, sodium carbonate, and calcium hydroxide, although we have left for future investigation detailed studies of the effects of specific salts.

It was found to hold very strictly that the "floc" which appeared first in any given series was invariably the best as far as flocculent appearance was concerned. It was also the "floc" which appeared first which possessed the qualities of rapid settling and abundance in the highest degree.

If we select those cases in which the total salt content—in this case buffer salts—was constant and in which the concentration of aluminium varied, we find, on plotting the final pH values against the flocculation time, that we have a family of curves of the general type shown in Figure 2.

In Figure 2 the concentration of "alum" was 400, 300, 200, and 100 p. p. m. for curves A, B, C, and D, respectively. The buffer

February 2, 1923.

strength (total salt) was the same in all cases. The optimum pH value for the production of a "floc" in a minimum time appears to increase slightly as the concentration of alum decreases. The following values are taken from Figure 2:

Using 400 p. p. m., the optimum pH value is about 4.95.

Using 300 p. p. m., the optimum pH value is about 5.10.

Using 200 p. p. m., the optimum pH value is about 5.25.

Using 100 p. p. m., the optimum pH value is about 5.40.

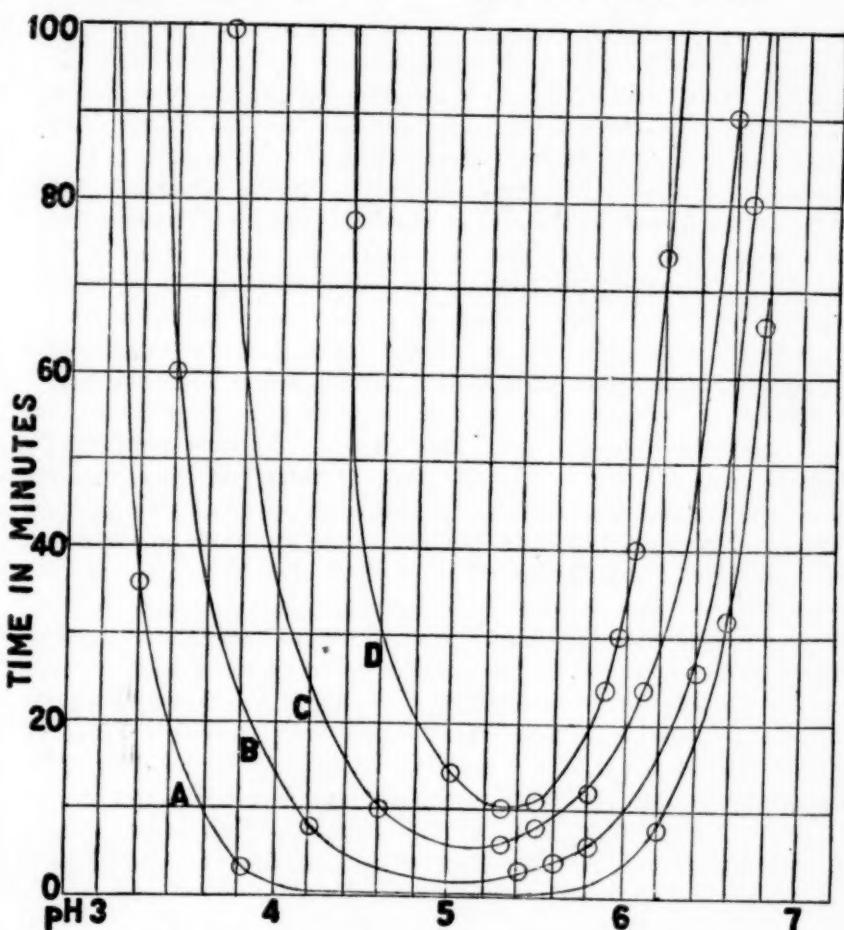


FIG. 2.—The relation between time required for the first appearance of floc in solutions buffered at various pH values when the total salt concentration is constant and the alum concentration is varied A=400 p.p.m. of alum; B=300 p.p.m. of alum; C=200 p.p.m. of alum; D=100 p.p.m. of alum.

When less than 100 p. p. m. are used, the optimum pH hovers about a value of 5.5, and it is this value which is of particular significance, since the amounts of "alum" ordinarily used are always considerably less than 100 p. p. m. (6 g. p. g.).

It is to be noted that as the concentration of "alum" decreases, the width of the curves also decreases. Using 400 p. p. m. of alum, the final pH value might be varied over a range of about 2.0 pH units, without any appreciable effect on the flocculation time. Using 100 p. p. m., however, the width of the optimum zone would be less than 1.0 pH unit. Using less than 50 p. p. m., it is necessary to adjust the solutions quite carefully in order to secure a "floc" within a reasonable time.

As stated above, these results were obtained with only slight agitation of the liquid made at the moment of observation and in 100-c. c. cylinders. Now, it is most interesting to note that the time of flocculation can be varied by forming the mix in vessels of different size. For instance, a large, shallow tank containing a large volume of buffer solution was allowed to deliver the buffer solution through a 1-inch pipe to an inclined trough. At the upper end of this trough there was delivered a small constant stream of alum solution. At the lower end a crosspiece formed a "hydraulic jump." The mixture, as it ran off the trough, was collected in vessels varying in capacity from 10 c. c. to 5,000 c. c., care being taken to avoid a graded order of collection. It was invariably found that the time for first appearance of floc was least in the large vessels. The same result was obtained by hand mixing and subsequent pouring of the mix into vessels of different size. The difference in time required for flocculation is remarkable, a precipitate forming within one minute in a large vessel and often requiring hours to become visible in small vessels. Though we recall no published data upon this phenomenon, we know that it is well recognized by plant operators, who have frequently observed that tests in laboratory vessels do not correspond to the flocculation in the basin. We have in one case plotted the time of flocculation against volume of collecting vessel and found the curve to become flat near the 2,000-c. c. volume. While we have not pursued this problem in sufficient detail for practical application, we are confident that, if necessary, a relation could be found for calculating the basin time from a series of small-volume experiments. However, the "volume" effect was constant in our laboratory experiments, and this factor therefore does not alter our conclusions regarding *relative pH effects*.

We believe that this "volume effect" is little more than the effect of the volume-surface ratio upon circulation, for mechanical circulation will decrease the time required for floc formation. We conducted a series of experiments like those summarized in Figure 2 and, in addition, imparted to the solution a slow rotary motion. The total amount of floc produced seemed not to be affected, and the optimal pH remained the same, though, of course, the time values were altered from those shown in Figure 2.

A few experiments made with very small quantities of alum indicate that the curves relating pH and flocculation time would be of the type shown in Figure 2, but that the two branches would tend to be closer together than those shown. Since the branches of the curve tend in all cases to become parallel, it is evident that no floc would become apparent for a very long time in vessels of laboratory size when the pH lay beyond the asymptote to either branch. With *very* dilute alum solutions the region of pH within which floc might appear in laboratory vessels might well narrow to a zone less than 0.3 pH units wide. Experimentally it has been found that if a floc does not appear within a few hours with slight occasional agitation, it will not appear within a greatly reduced time when there is mechanical agitation. It would thus appear that under large-volume conditions a rigid control of the final pH is necessary for floc formation from extremely dilute alum solutions.

We stated in a former section that, without much confidence in its accuracy, we obtained a provisional value of 5.5 for the isoelectric point. With still less confidence in the sufficiency of the reasoning, we then suggested that a study of flocculation time would reveal the isoelectric point. We then arrived, by experimental methods, at the point pH 5.5 for the minimum coagulation time in dilute solution. An examination of the data of Buswell and Edwards (1922) on residual alum found under commercial conditions suggests that if there were included data for effluents of pH values lower than those observed, there would be obtained a curve relating pH and residual alum passing through a minimum residual alum point at about pH 5.5. Thus, whatever uncertainty there may be in each mode of approach, there is substantial agreement in the tentative results of each method.

Up to this point we have considered only those experiments in which the various experimental conditions were kept as constant as possible and, so far as was practicable, only the hydrogen ion concentration and the total aluminium were varied. Since experimenters in other fields have reported the effects on coagulation of the total salt, we have studied the effect of varying the concentration of the buffer solutions used.

The influence of the salt content is evident from an inspection of Figure 3. In the derivation of the experimental values, 100 p. p. m. of alum were used in all cases. The buffers for curves A, B, and C are $\frac{M}{20}$, $\frac{M}{100}$, and $\frac{M}{200}$, respectively. The width of the optimum zone decreases as the buffer concentration, i. e., total salt, decreases. We would expect that a water of low alkalinity or low total salt content should require a much more delicate adjustment of the dose of alum than a water of high alkalinity or high salt content.

In the above experiments we have avoided the use of carbonate solutions and have selected buffer salts adapted to the control of pH values within the ranges desired. Our first concern, of necessity, was to produce conditions accurately controlled for laboratory studies rather than conditions directly comparable with those obtained in natural waters. We were confident that this method of attack would, if handled with due caution, lead directly to a clarification of the commercial problem. In this we were not disappointed, as the following experiments will indicate.

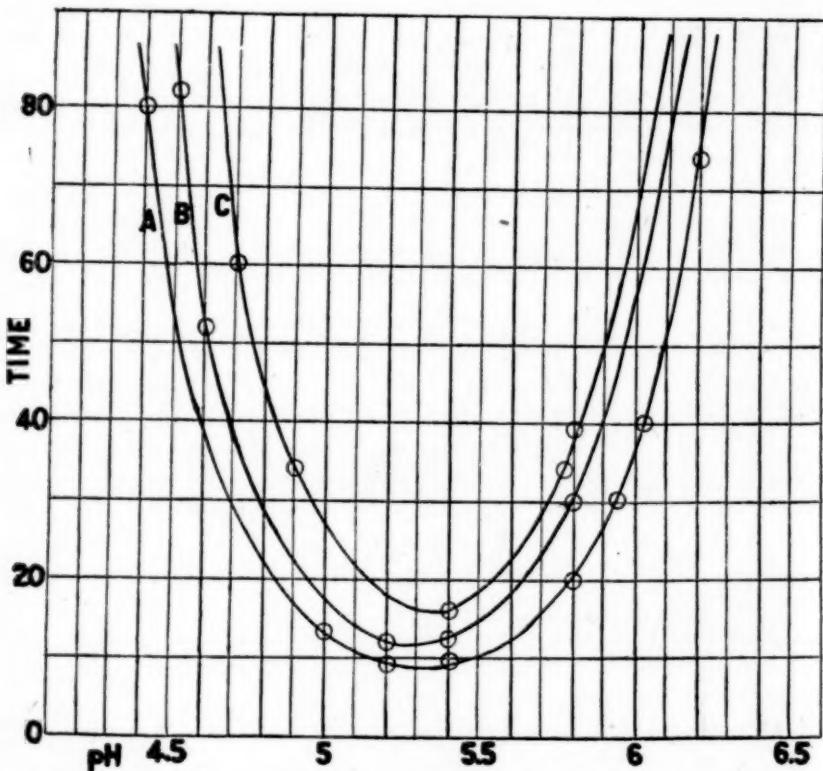


Fig. 3.—The relation between time (in minutes) required for the first appearance of floc in solutions buffered at various pH values when the total alum is constant and the total salt concentration is varied. Alum, 100 p.p.m. A = $\frac{M}{20}$ salt; B = $\frac{M}{100}$ salt; C = $\frac{M}{200}$ salt.

As will be seen from the titration curves given in Figure 1, there is sufficient slope near pH 5.5 to obtain a slight but definite buffer action with aluminium sulphate and a hydroxide. While the buffer action is by no means as marked as it is in the case where supplementary buffers, such as phosphate mixtures, are used, it is nevertheless sufficient. At acidities as high as pH 5.5 the carbon dioxide of the air is not nearly as effective in disturbing the equilibrium of dilute solutions as it is in dilute solutions nearer to neutrality. It was,

therefore, possible, by very careful manipulation, to obtain mixtures of aluminium sulphate and calcium hydroxide having definite pH values in the range from pH 4.6 to 6.0. It is obvious that in using a constant amount of alkali without supplementary buffers, it is necessary to vary the concentration of the aluminium in order to obtain different pH values. Conversely, if we use a constant amount of aluminium sulphate, we must vary the concentration of the alkali. Since the salts themselves (in this case alkalies) exert a specific

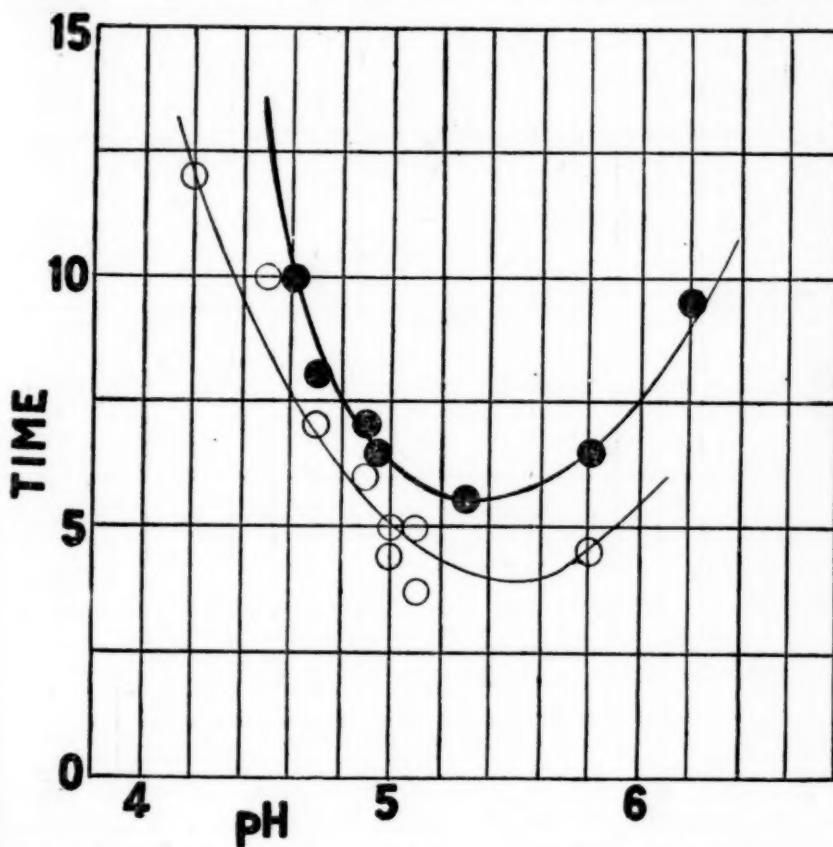


Fig. 4.—Relation of time (in minutes) required for first appearance of floc in mixtures of alum and calcium hydroxide of indicated pH values.

coagulating effect, it is obvious that one end of the series will not be strictly comparable with the other end. This results in a dissymmetry in the curves obtained, which may be overcome somewhat by the addition of a "neutral" salt, such as sodium chloride. Since we are dealing with mixtures having comparatively little buffer effect in the range in which we desire to work, it becomes a rather difficult matter to make all the adjustments necessary so that one end of a series of solutions will be more or less comparable with the other end.

Since, in general, the results with these somewhat unstable mixtures harmonized with the results obtained when more definitely controlled solutions were used, we were content for the time being to assume that the conclusions would be applicable without much, if any, change to the case of natural water. In fact, experiments using Washington, D. C., city tap water have shown that this particular water, at least, is very much easier to handle than pure solutions of hydroxides or carbonates.

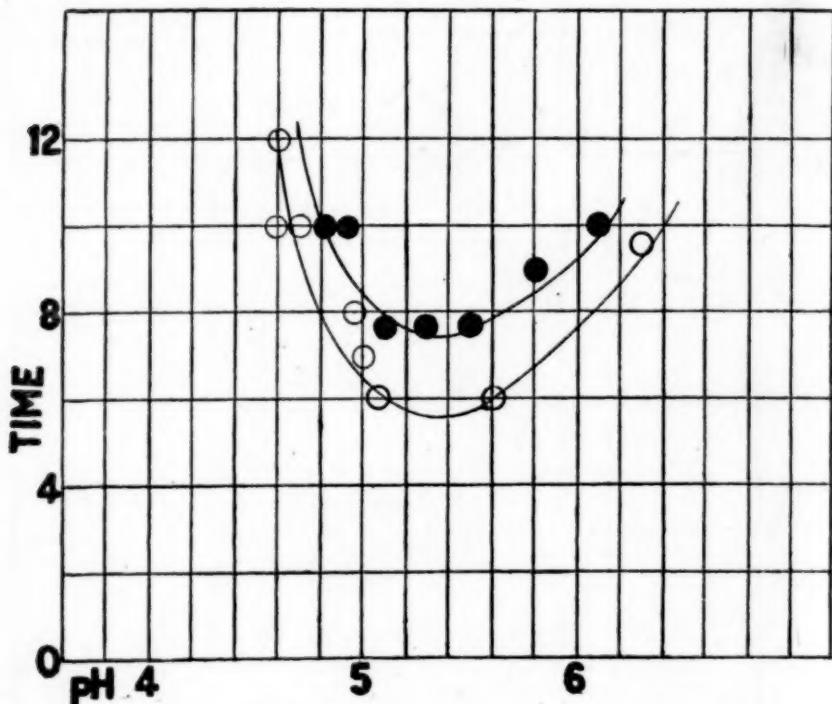


Fig. 5.—Relation of time (in minutes) required for first appearance of floc in mixtures of alum and sodium hydroxide of indicated pH values.

In Figure 4 we have presented some results obtained, using $\text{Ca}(\text{OH})_2$ without the use of supplementary buffers. The various pH values were obtained by using different amounts of alum. The strength of the $\text{Ca}(\text{OH})_2$ solution was about $\frac{\text{M}}{500}$. The curve could not be extended very far toward the right-hand side. The optimum pH value certainly lies between pH 5 and pH 6.

In Figure 5 we have presented results obtained, using $\frac{\text{M}}{500}$ NaOH with varying amounts of alum. The best floc was obtained at a pH value of about 5.2. It is interesting to compare this curve with the curve shown in Figure 6, in which the amount of alum added was kept constant and the concentration of alkali was varied. The

February 2, 1923.

optimum in Figure 6 is around pH 5.8. We would conclude from Figures 4, 5, and 6 that the optimum pH value for the coagulation of aluminium sulphate was somewhere between pH 5 and pH 6. Using buffered solutions, we have fixed on the value of about 5.5 when less than 100 p. p. m. of alum is used.

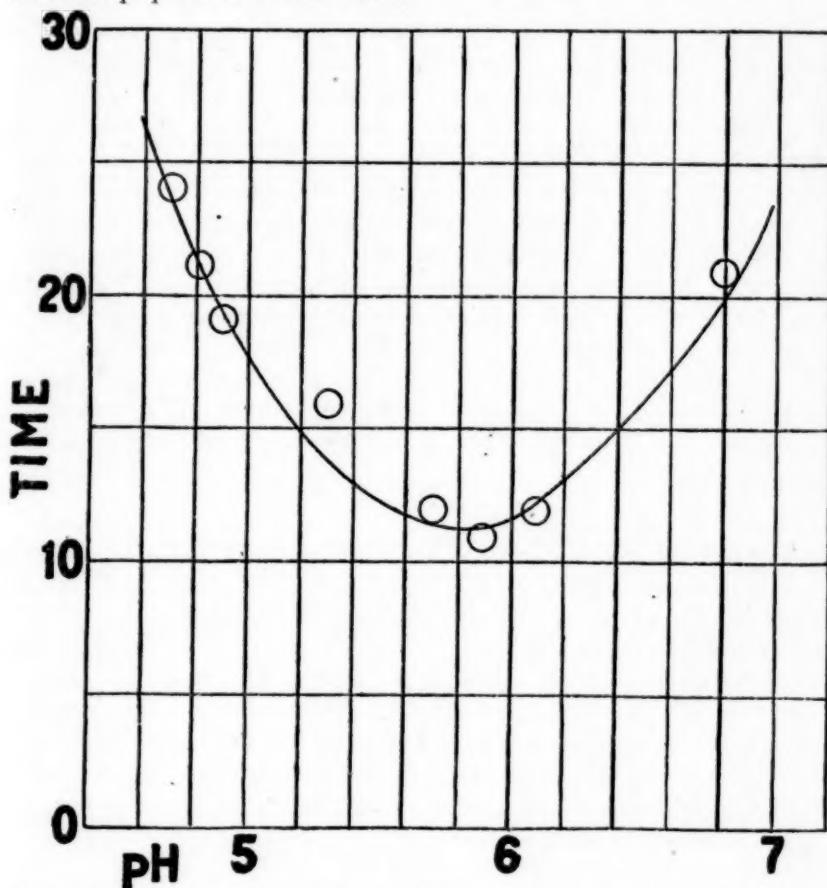


Fig. 6.—Relation of time (in minutes) required for first appearance of floc in mixtures of alum and sodium hydroxide of indicated pH values when the alum is constant in all cases.

It has been found that the results of the flocculation experiments may be represented with great fidelity by the use of expressions, the general form of which is—

$$t = k_1 e^{k_2 x^2}$$

When t = flocculation time expressed in minutes;

x = deviation of pH value from optimum = $\text{pH} - \text{pH}_0$ when $\text{pH}_0 = 5.5$;

k_2 = a constant for a given buffer strength;

k_1 = a constant for a given concentration of alum; and

e = base of Naperian logarithms.

We shall not dwell upon the constants found for the laboratory conditions, but we do call attention to the possibility that a formula of this type, if it embody constants applicable to a particular locality, may prove useful.

In conclusion, we wish to emphasize the fact that we have not concerned ourselves with relations between the precipitates formed and the nature of the coloring matters and suspensions which the floc is intended to remove under commercial conditions. We have made an attack only upon the conditions governing floc formation when the possible influence of color and suspension is left out of consideration. The laboratory results therefore have a limited range of application unless the unaccounted factors can be shown to be of negligible importance. However, the experiments described undoubtedly lay some of the groundwork upon which further studies may be built, and in certain respects they are directly applicable to commercial conditions. Certain of the practical conclusions are altogether too obvious to require further discussion. Others involve a detailed consideration of aspects with which we are not now concerned, and we may therefore leave their discussion to other investigators.

SUMMARY.

The outstanding features of the results of this study are as follows:

The hydrogen ion concentration of the final mixture of water and alum is of fundamental importance in the formation of floc. When other possible factors are left out of consideration, optimum conditions for floc formation will be found with a narrow zone of pH centered for dilute solutions at pH 5.5. The more dilute the water in total salt content and the less the alum added, the narrower becomes the pH zone with which optimum floc formation is to be found. Consequently, precise pH control should in favorable cases permit of great economy in alum dosage.

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February 2, 1923.

SOME NEW SULFONPHTHALEIN INDICATORS.

A Preliminary Note.

By BARNETT COHEN, Associate Chemist, Hygienic Laboratory, United States Public Health Service.

For the determination of H-ion concentration by the colorimetric method, the indicator series of Clark and Lubs has been found extremely useful. Improvement of this indicator series may be sought in two ways: One is the introduction of suitable indicators to fill gaps in the pH scale not now adequately covered; the second is in the substitution of a sulfonphthalein compound for methyl red. As is well known, methyl red is much less stable than the sulfonphthalein indicators and is readily reduced. Clark and Lubs retained it in their series because methyl red was at that time indispensable in covering an important pH range.

The following new sulfonphthalein indicators are suggested as filling the above requirements. The dyes were synthesized in the usual way, complete details of which will be published later.

Chemical name.	Suggested common name.	Color change.	pH range.
m-Cresol sulfonphthalein.....	Meta cresol purple.....	Red to yellow.....	0.5-2.5
Dibromo-dichloro-phenol sulfon-phthalein.	Brom-chlor phenol blue.....	Yellow to purple.....	7.6-0.2
Tetra bromo-m-cresol sulfon-phthalein.	Brom cresol green.....	Yellow to blue.....	3.2-1.8
Dichloro phenol sulfonphthalein.	Chlor phenol red.....	Yellow to blue green.....	4.0-5.6
Dibromo phenol sulfonphthalein..	Brom phenol red.....	Yellow to red.....	5.0-6.6
		do.....	5.4-7.0

Brom cresol green covers almost perfectly the range of methyl red, the apparent dissociation constants in terms of pH being 5.00 and 4.95, respectively.

Brom phenol red and *chlor phenol red*, because of their color changes (yellow to red), may be used advantageously where the dichromatism of brom cresol purple is a disturbing factor.

The protein and salt errors of these new indicators remain to be determined. It is tentatively assumed that such errors are of the same magnitude as those of the other sulfonphthaleins now in use.

INFLUENZA IN THE UNITED STATES.

The following table shows the numbers of cases of influenza reported by State health officers, by telegraph, for the week ended January 27, 1923, compared with similar reports for the corresponding week of 1922, 1921, and 1920.

Similar tables covering the period from October 1, 1922, to January 20, 1923, were published in the Public Health Reports

December 29, 1922, page 3204; January 12, 1923, page 64; and January 26, 1923, page 141.

Cases of influenza reported by telegraph by State health officers for the week ended Jan. 27, 1923, compared with similar reports for the corresponding week of the years 1922, 1921, and 1920.

Division and State.	Week ended—			
	Jan. 27, 1923.	Jan. 28, 1922.	Jan. 29, 1921.	Jan. 31, 1920.
New England Division:				
Maine.....	25	14	7	387
Massachusetts.....	131	66	15	(1)
Vermont.....		1	3	80
Connecticut.....	120	22	13	4,664
Middle Atlantic Division:				
New York (exclusive of New York City).....	408	173	79	4,755
New York City.....	441	1,230	72	30,456
New Jersey.....	138	126	33	7,365
East North Central Division:				
Indiana.....	63	(1)	(1)	(1)
Illinois.....	350	125	19	29,156
Wisconsin.....	174	22	43	6,739
West North Central Division:				
South Dakota.....	2	1	5	(1)
Nebraska.....	38		1	1,815
Kansas.....	225	121	29	(1)
South Atlantic Division:				
Delaware.....	38	2	4	21
Maryland.....	1,602	93	107	(1)
District of Columbia.....	190	26	4	(1)
West Virginia.....	192	(1)	(1)	(1)
Georgia.....	729	64	25	617
Florida.....	100	6	10	1,547
South Carolina.....		(1)	(1)	(1)
East South Central Division:				
Kentucky.....	(1)	35	19	878
Alabama.....	1,681	3		203
Mississippi.....	5,453	(1)	(1)	(1)
West South Central Division:				
Arkansas.....	2,415	88	37	(1)
Louisiana.....	501	8	10	763
Texas.....	390	5		(1)
Mountain Division:				
Colorado (exclusive of Denver).....	3	2	(1)	(1)
New Mexico.....	32		2	260
Pacific Division:				
Washington.....	(1)	33	(1)	902
Oregon.....	30	7	(1)	(1)
California.....	176	48	37	6,615

¹ No report.

² 11 cases reported for two weeks ended Jan. 28.

³ 69 cases reported for two weeks ended Jan. 28.

The following table shows the numbers of deaths from pneumonia (all forms) and influenza, combined, in certain large cities of the United States for the weeks ended January 13 and 20, 1923, as reported by city health officers.

A similar table covering the period from December 3, 1922, to January 6, 1923, was published in the Public Health Reports January 19, 1923, page 101.

February 2, 1923.

Deaths from pneumonia (all forms) and influenza, combined, in large cities of the United States, January 7 to January 20, 1923, inclusive.

City.	Week ended—		City.	Week ended—	
	Jan. 13, 1923.	Jan. 20, 1923.		Jan. 13, 1923.	Jan. 20, 1923.
Alabama:			Minnesota:		
Birmingham.....	19	17	Duluth.....	2	2
Mobile.....	5	2	Minneapolis.....	19	6
California:			St. Paul.....	7	13
Berkeley.....	3	3	Missouri:		
Long Beach.....	3	1	Kansas City.....	15	25
Los Angeles.....	24	24	St. Joseph.....	5	6
Oakland.....	6	5	Nebraska:		
Sacramento.....	5	4	Lincoln.....	3	1
San Diego.....	4	4	Omaha.....	20	8
San Francisco.....	5	8	New Jersey:		
Colorado:			Atlantic City.....	1	3
Denver.....	17	21	East Orange.....	5	4
Connecticut:			Hoboken.....	17	13
Bridgeport.....	7	9	Newark.....	3	1
Hartford.....	1	2	Passaic.....	10	8
New Britain.....	3	10	Trenton.....	27	21
New Haven.....	13	9	New York:		
Waterbury.....	3	.....	Buffalo.....	195	243
District of Columbia:			New York.....	5	3
Washington.....	35	35	Niagara Falls.....	12	11
Florida:			Rochester.....	2	1
Tampa.....	4	0	Schenectady.....	10	7
Georgia:			Syracuse.....	4	3
Atlanta.....	46	46	Troy.....	1	8
Augusta.....	.....		Yonkers.....	5	5
Savannah.....	12	8	Ohio:		
Illinois:			Canton.....	40	43
Chicago.....	133	99	Cincinnati.....	38	34
East St. Louis.....	5	5	Columbus.....	25	26
Peoria.....	9	6	Springfield.....	7	5
Rockford.....	2	3	Toledo.....	8	15
Springfield.....	3	7	Youngstown.....	4	6
Indiana:			Oklahoma:		
Fort Wayne.....	2	2	Oklahoma.....	8	1
Gary.....	5	8	Oregon:		
Indianapolis.....	18	20	Portland.....	11	7
South Bend.....	1	.....	Pennsylvania:		
Terre Haute.....	4	3	Philadelphia.....	183	176
Kansas:			Rhode Island:		
Topeka.....	3	3	Pawtucket.....	9	14
Wichita.....	5	6	Providence:		
Kentucky:			South Carolina:		
Covington.....	9	13	Charleston.....	13	4
Louisville.....	23	24	Tennessee:		
Louisiana:			Memphis.....	15	26
New Orleans.....	13	25	Nashville.....	16	.....
Maine:			Texas:		
Portland.....	2	4	Dallas.....	8	13
Maryland:			El Paso.....	3	.....
Baltimore.....	62	43	Fort Worth.....	9	5
Massachusetts:			Houston.....	11	6
Boston.....	63	72	San Antonio.....	4	6
Cambridge.....	7	8	Utah:		
Fall River.....	11	6	Salt Lake City.....	6	2
Haverhill.....	1	.....	Virginia:		
Holyoke.....	3	1	Norfolk.....	7	3
Lawrence.....	2	3	Portsmouth.....	2	2
Lowell.....	4	6	Richmond.....	9	13
Lynn.....	5	1	Roanoke.....	5	3
New Bedford.....	5	8	West Virginia:		
Somerville.....	2	4	Huntington.....	9	5
Springfield.....	5	2	Wheeling.....	3	5
Worcester.....	6	13	Wisconsin:		
Michigan:			Milwaukee.....	3	4
Detroit.....	68	64	Bacine.....	.....
Flint.....	6	5			
Grand Rapids.....	5	8			
Saginaw.....	1	1			

TYPHOID FEVER, MINNESOTA, 1921.—CORRECTION.

In the table on page 3206 of Public Health Reports for December 29, 1922, the number of deaths from typhoid fever in Minnesota during 1921 was given as 888. This number should have been 88. The rate given, 3.6 per 100,000 population, was computed on the basis of 88 deaths.

Examination for Entrance into the Regular Corps of the Public Health Service.

Examinations of candidates for entrance into the Regular Corps of the United States Public Health Service will be held at the following-named places on the dates specified:

Chicago, Ill., March 12, 1923.

San Francisco, Calif., March 12, 1923.

Washington, D. C., March 12, 1923.

Candidates must be not less than 23 nor more than 32 years of age, and they must have been graduated in medicine at some reputable medical college, and have had one year's hospital experience or two years' professional practice. They must pass satisfactory physical, academic, and professional examinations before boards of commissioned medical officers.

Successful candidates will be recommended for appointment by the President, with the advice and consent of the Senate.

Requests for information or permission to take this examination should be addressed to the Surgeon General, United States Public Health Service, Washington, D. C.

DEATHS DURING WEEK ENDED JANUARY 20, 1923.

Summary of information received by telegraph from industrial insurance companies for week ended January 20, 1923, and corresponding week of 1922. (From the Weekly Health Index, January 23, 1923, issued by the Bureau of the Census, Department of Commerce.)

		Week ended Jan. 20, 1923.	Corresponding week, 1922.
Policies in force.....	50,969,269	48,027,683	
Number of death claims.....	10,992	9,481	
Death claims per 1,000 policies in force, annual rate.....	11.2	10.3	

Deaths from all causes in certain large cities of the United States during the week ended January 20, 1923, infant mortality, annual death rate, and comparison with corresponding week of 1922. (From the Weekly Health Index, January 23, 1923, issued by the Bureau of the Census, Department of Commerce.)

City.	Estimated population July 1, 1923.	Week ended Jan. 20, 1923.		Annual death rate per 1,000, corre- sponding week 1922.	Deaths under 1 year.		Infant mor- tality rate, week ended Jan. 20, 1923. ²
		Total deaths.	Death rate. ¹		Week ended Jan. 20, 1923.	Corre- sponding week ended Jan. 20, 1922.	
Total.....	28,724,833	8,217	14.9	14.1	1,038	966	.....
Akron, Ohio.....	3 208,435	36	9.0	8.3	14	6	166
Albany, N. Y.....	117,375	44	19.5	18.4	5	3	111
Atlanta, Ga.....	222,963	104	24.3	16.4	21	12	.....
Baltimore, Md.....	773,580	232	17.0	16.1	36	35	100

¹ Annual rate per 1,000 population.

² Deaths under 1 year per 1,000 births—an annual rate based on deaths under 1 year for the week and estimated births for 1922. Cities left blank are not in the registration area for births.

³ Enumerated population Jan. 1, 1920.

February 2, 1923.

Deaths from all causes in certain large cities of the United States during the week ended January 20, 1923, infant mortality, annual death rate, and comparison with corresponding week of 1922. (From the Weekly Health Index, January 23, 1923, issued by the Bureau of the Census, Department of Commerce.)—Continued.

City.	Estimated population July 1, 1923.	Week ended Jan. 20, 1923.		Annual death rate per 1,000, corresponding week 1922.	Deaths under 1 year.		Infant mortality rate, week ended Jan. 20, 1923.
		Total deaths.	Death rate.		Week ended Jan. 20, 1923.	Corresponding week 1922.	
Birmingham, Ala.	195,901	61	16.2	16.9	9	11	—
Boston, Mass.	770,400	304	20.6	17.5	39	28	112
Bridgeport, Conn.	* 143,555	46	16.7	15.3	7	6	97
Buffalo, N. Y.	536,718	152	14.8	11.6	24	14	101
Cambridge, Mass.	111,441	37	17.3	14.1	6	4	107
Camden, N. J.	124,157	59	24.8	20.1	4	10	66
Chicago, Ill.	* 2,832,288	625	11.5	12.2	81	100	—
Cincinnati, Ohio.	403,312	166	21.3	17.1	11	6	72
Cleveland, Ohio.	877,992	205	12.2	12.1	28	28	77
Columbus, Ohio.	261,082	102	20.4	14.0	4	9	42
Dallas, Tex.	177,274	52	15.3	14.6	8	9	—
Dayton, Ohio.	165,530	40	12.6	8.7	8	6	131
Denver, Colo.	272,031	89	17.1	16.4	16	7	—
Detroit, Mich.	* 993,678	288	15.1	11.5	54	44	108
Duluth, Minn.	103,280	22	10.8	—	2	—	46
Erie, Pa.	112,571	27	12.5	10.9	2	3	41
Fall River, Mass.	120,912	44	19.0	13.4	9	7	128
Flint, Mich.	117,968	26	11.5	—	3	—	60
Fort Worth, Tex.	125,021	21	8.8	5.9	3	0	—
Grand Rapids, Mich.	145,947	46	16.4	11.3	5	2	79
Houston, Tex.	151,970	39	13.1	11.8	7	5	—
Indianapolis, Ind.	340,882	92	14.1	12.7	8	9	62
Jacksonville, Fla.	100,046	36	18.8	13.9	0	5	—
Jersey City, N. J.	300,034	80	13.5	14.0	11	17	74
Kansas City, Kans.	115,781	37	16.7	17.0	10	3	229
Kansas City, Mo.	351,319	115	17.0	14.6	15	10	—
Los Angeles, Calif.	666,853	211	16.5	14.7	18	17	67
Louisville, Ky.	257,671	89	18.0	15.4	11	7	119
Lowell, Mass.	115,089	40	18.1	10.9	4	1	70
Memphis, Tenn.	170,057	85	26.1	20.5	12	12	—
Milwaukee, Wis.	484,595	105	11.3	11.0	20	16	99
Minneapolis, Minn.	409,125	88	11.2	10.4	10	7	54
Nashville, Tenn.	121,128	66	28.4	19.5	4	4	—
New Bedford, Mass.	130,072	39	15.6	13.9	6	7	89
New Haven, Conn.	172,967	33	9.9	13.8	6	7	73
New Orleans, La.	404,575	146	18.8	19.7	22	15	—
New York, N. Y.	5,927,625	1,453	12.8	14.1	178	203	71
Bronx Borough.	840,544	153	9.5	11.4	15	19	53
Brooklyn Borough.	2,156,687	475	11.5	12.9	52	75	55
Manhattan Borough.	2,267,001	681	15.7	16.6	93	95	99
Queens Borough.	535,844	87	8.5	10.8	12	15	64
Richmond Borough.	127,549	57	23.3	21.8	6	4	109
Newark, N. J.	438,699	109	13.0	13.3	9	16	42
Norfolk, Va.	* 124,915	38	15.9	10.9	5	5	88
Oakland, Calif.	240,086	69	15.0	13.4	8	4	103
Omaha, Nebr.	204,332	41	10.5	18.7	8	4	87
Paterson, N. J.	139,579	28	10.5	12.8	1	1	16
Philadelphia, Pa.	1,922,788	708	19.2	15.4	78	62	101
Pittsburgh, Pa.	* 607,902	247	21.2	16.6	36	41	125
Portland, Oreg.	273,621	78	14.9	13.0	6	8	61
Providence, R. I.	242,378	113	24.3	15.8	14	7	114
Richmond, Va.	181,044	54	15.6	15.5	12	7	147
Rochester, N. Y.	317,867	86	14.1	10.2	16	8	126
St. Louis, Mo.	803,853	212	13.8	15.7	14	20	—
St. Paul, Minn.	241,891	53	11.4	10.4	6	3	55
Salt Lake City, Utah.	126,241	33	13.6	16.4	1	4	16
San Antonio, Tex.	184,727	57	16.1	—	13	—	—
San Francisco, Calif.	539,038	158	15.3	15.3	12	5	72
Seattle, Wash.	* 315,312	56	9.3	9.8	7	5	62
Spokane, Wash.	104,573	21	10.5	13.5	2	0	44
Springfield, Mass.	144,227	31	11.2	9.7	3	2	43
Syracuse, N. Y.	184,511	55	15.5	11.8	7	8	91
Tacoma, Wash.	101,731	16	8.2	—	3	—	75
Toledo, Ohio.	268,338	72	14.0	15.2	9	10	91
Trenton, N. J.	127,390	53	21.7	22.1	3	15	51
Washington, D. C.	* 437,571	152	18.1	17.9	12	18	69
Worcester, Mass.	191,927	50	13.6	16.3	5	9	56
Yonkers, N. Y.	107,520	25	12.1	9.4	4	4	87

* Enumerated population Jan. 1, 1920.

* Estimated population July 1, 1922.

PREVALENCE OF DISEASE.

No health department, State or local, can effectively prevent or control disease without knowledge of when, where, and under what conditions cases are occurring.

UNITED STATES.

CURRENT STATE SUMMARIES.

These reports are preliminary, and the figures are subject to change when later returns are received by the State health officers.

Reports for Week Ended January 27, 1923.

ALABAMA.		CALIFORNIA—continued.	
	Cases		Cases.
Cerebrospinal meningitis.....	1	Lethargic encephalitis:	
Chicken pox.....	25	East San Diego.....	1
Dengue.....	11	Los Angeles.....	1
Diphtheria.....	25	Sacramento.....	1
Influenza.....	1,681	San Francisco.....	6
Malaria.....	23	Measles.....	110
Measles.....	28	Poliomyelitis:	
Ophthalmia neonatorum.....	1	Los Angeles.....	1
Pellagra.....	4	Oakland.....	1
Pneumonia.....	157	Scarlet fever.....	121
Scarlet fever.....	11	Smallpox.....	10
Smallpox.....	10	Typhoid fever.....	10
Trachoma.....	1		
Tuberculosis.....	25	COLORADO.	
Typhoid fever.....	6	(Exclusive of Denver.)	
Whooping cough.....	12	Chicken pox.....	46
		Diphtheria.....	24
ARKANSAS.		Influenza.....	3
Cerebrospinal meningitis.....	1	Measles.....	2
Chicken pox.....	55	Mumps.....	16
Diphtheria.....	8	Pneumonia.....	8
Hookworm disease.....	4	Scarlet fever.....	25
Influenza.....	2,415	Smallpox.....	4
Malaria.....	26	Tuberculosis.....	3
Measles.....	72	Typhoid fever.....	2
Mumps.....	6	Whooping cough.....	24
Pellagra.....	6		
Scarlet fever.....	8	CONNECTICUT.	
Smallpox.....	3	Chicken pox.....	56
Trachoma.....	1	Diphtheria.....	59
Tuberculosis.....	12	German measles.....	2
Typhoid fever.....	7	Influenza.....	120
Whooping cough.....	17	Measles.....	485
		Mumps.....	21
CALIFORNIA.		Pneumonia (lobar).....	67
Cerebrospinal meningitis—Los Angeles.....	1	Scarlet fever.....	98
Diphtheria.....	166	Smallpox.....	3
Influenza.....	176	Tuberculosis (all forms).....	19
Leprosy—San Francisco.....	1	Typhoid fever.....	3
		Whooping cough.....	89

February 2, 1923.

DELAWARE.

Cases.

Anthrax.....	1
Chicken pox.....	6
Diphtheria.....	6
Influenza.....	38
Measles.....	80
Pneumonia.....	9
Scabies.....	1
Scarlet fever:	
Dover.....	4
Wilmington.....	12
Tuberculosis.....	1
Whooping cough.....	3

FLORIDA.

Cases.

Diphtheria.....	18
Influenza.....	100
Malaria.....	13
Pneumonia.....	12
Scarlet fever.....	5
Smallpox.....	10
Typhoid fever.....	6

GEORGIA.

Cerebrospinal meningitis.....	1
Chicken pox.....	15
Dengue.....	1
Diphtheria.....	14
Hookworm disease.....	9
Influenza.....	729
Malaria.....	4
Measles.....	125
Mumps.....	3
Paratyphoid fever.....	1
Pellagra.....	1
Pneumonia.....	59
Scarlet fever.....	9
Septic sore throat.....	1
Smallpox.....	25
Tetanus.....	1
Trachoma.....	1
Tuberculosis (all forms).....	7
Typhoid fever.....	5
Whooping cough.....	9

ILLINOIS.

Cerebrospinal meningitis:	
Adams County.....	1
Chicago.....	1
Lee County.....	1
Diphtheria:	
Cook County (including Chicago).....	202
Chicago.....	183
Hancock County.....	24
Kane County.....	10
Lake County.....	9
Livingston County.....	15
Madison County.....	37
Stephenson County.....	8
Scattering.....	104
Influenza:	
Chicago.....	121
Scattering.....	229
Pneumonia.....	563
Poliomyelitis—Chicago.....	1

ILLINOIS—continued.

Cases.

Scarlet fever:	
Cook County (including Chicago).....	107
Chicago.....	90
Iroquois County.....	8
Peoria County.....	18
Whiteside County.....	9
Winnebago County.....	9
Scattering.....	152
Smallpox:	
Will County.....	48
Scattering.....	26
Typhoid fever.....	12
Whooping cough.....	288

INDIANA.

Diphtheria.....	115
Influenza.....	63
Pneumonia.....	14
Scarlet fever.....	123
Smallpox.....	46
Typhoid fever.....	1

IOWA.

Diphtheria.....	32
Scarlet fever.....	132
Smallpox.....	23

KANSAS.

Chicken pox.....	113
Diphtheria.....	122
Influenza.....	225
Malaria.....	2
Measles.....	49
Mumps.....	44
Pneumonia.....	105
Scarlet fever.....	138
Smallpox.....	10
Tuberculosis.....	28
Typhoid fever.....	4
Whooping cough.....	31

LOUISIANA.

Cerebrospinal meningitis.....	1
Dengue.....	965
Diphtheria.....	48
Influenza.....	501
Scarlet fever.....	5
Smallpox.....	26
Typhoid fever.....	16

MAINE.

Chicken pox.....	16
Conjunctivitis (infectious).....	2
Diphtheria.....	10
Influenza.....	25
Lethargic encephalitis.....	1
Measles.....	58
Mumps.....	2
Pneumonia.....	19
Poliomyelitis.....	2
Scarlet fever.....	27
Smallpox.....	2
Tubercolosis.....	17
Typhoid fever.....	3
Whooping cough.....	80

MARYLAND. ¹	Cases.	MONTANA.	Cases.
Cerebrospinal meningitis.....	2	Diphtheria.....	19
Chicken pox.....	175	Scarlet fever.....	24
Diphtheria.....	66	Smallpox.....	10
German measles.....	12	Typhoid fever.....	1
Influenza.....	1,602	NEBRASKA.	
Lethargic encephalitis.....	2	Chicken pox.....	20
Measles.....	235	Diphtheria:	
Mumps.....	10	Omaha.....	12
Ophthalmia neonatorum.....	1	Scattering.....	14
Paratyphoid fever.....	1	Influenza.....	38
Pneumonia (all forms).....	224	Measles:	
Poliomyelitis.....	2	Rushville.....	17
Scarlet fever.....	106	Scattering.....	1
Septic sore throat.....	5	Mumps.....	7
Tuberculosis.....	60	Pneumonia.....	1
Typhoid fever.....	9	Scarlet fever.....	52
Vincent's angina.....	2	Septic sore throat.....	3
Whooping cough.....	124	Smallpox.....	4
MASSACHUSETTS.		Tuberculosis.....	3
Anthrax.....	1	Typhoid fever.....	1
Cerebrospinal meningitis.....	3	Whooping cough.....	13
Chicken pox.....	189	NEW JERSEY.	
Diphtheria.....	179	Cerebrospinal meningitis.....	2
German measles.....	6	Chicken pox.....	222
Influenza.....	131	Diphtheria.....	174
Lethargic encephalitis.....	1	Influenza.....	138
Measles.....	334	Malaria.....	1
Mumps.....	213	Measles.....	1,290
Ophthalmia neonatorum.....	25	Paratyphoid fever.....	1
Pneumonia (lobar).....	180	Pneumonia.....	225
Poliomyelitis.....	2	Poliomyelitis.....	1
Scarlet fever.....	313	Scarlet fever.....	191
Septic sore throat.....	3	Trachoma.....	1
Trachoma.....	3	Typhoid fever.....	3
Tuberculosis (all forms).....	126	Whooping cough.....	181
Typhoid fever.....	4	NEW MEXICO.	
Whooping cough.....	397	Chicken pox.....	1
MICHIGAN.		Diphtheria:	
Diphtheria.....	166	Albuquerque.....	19
Measles.....	161	Scattering.....	57
Pneumonia.....	220	German measles.....	1
Scarlet fever.....	303	Influenza.....	32
Smallpox.....	216	Measles.....	1
Tuberculosis.....	60	Mumps.....	1
Typhoid fever.....	17	Pneumonia.....	19
Whooping cough.....	105	Scarlet fever.....	8
MINNESOTA.		Smallpox.....	1
Chicken pox.....	16	Trachoma.....	1
Diphtheria.....	93	Tuberculosis.....	20
Measles.....	236	Typhoid fever.....	1
Pneumonia.....	7	Whooping cough.....	3
Scarlet fever.....	275	NEW YORK.	
Smallpox.....	83	(Exclusive of New York City.)	
Tuberculosis.....	87	Cerebrospinal meningitis.....	2
Typhoid fever.....	1	Diphtheria.....	176
Whooping cough.....	6	Influenza.....	408
MISSISSIPPI.		Measles.....	453
Diphtheria.....	13	Pneumonia.....	456
Influenza.....	5,453	Poliomyelitis.....	5
Scarlet fever.....	6	Scarlet fever.....	294
Smallpox.....	2	Smallpox.....	8
Typhoid fever.....	5	Typhoid fever.....	19
Whooping cough.....		Whooping cough.....	295

¹ Week ended Friday,

February 2, 1923.

NORTH CAROLINA.		Cases.	VIRGINIA.	
Cerebrospinal meningitis.....	2		Cerebrospinal meningitis:	Cases.
Chicken pox.....	67		Rockingham County.....	1
Diphtheria.....	43		Smallpox.....	
German measles.....	6		Floyd County.....	5
Measles.....	447			
Ophthalmia neonatorum.....	1			WASHINGTON.
Poliomyelitis.....	1		Cerebrospinal meningitis:	
Scarlet fever.....	40		Benton County.....	1
Septic sore throat.....	14		Chicken pox.....	84
Smallpox.....	95		Diphtheria:	
Typhoid fever.....	9		Spokane.....	10
Whooping cough.....	227		Scattering.....	10
			Lethargic encephalitis:	
OREGON.			Skagit County.....	3
Chicken pox.....	28		Vancouver County.....	1
Diphtheria:			Measles.....	5
Portland.....	17		Mumps.....	5
Scattering.....	2		Scarlet fever:	
Influenza.....	30		Seattle.....	9
Lethargic encephalitis.....	8		Tacoma.....	21
Measles.....	1		Scattering.....	24
Mumps.....	5		Smallpox:	
Ophthalmia neonatorum.....	1		Spokane.....	11
Pneumonia.....	17		Seattle.....	9
Scarlet fever.....	14		Scattering.....	23
Septic sore throat.....	1		Tuberculosis.....	2
Smallpox.....	12		Typhoid fever.....	7
Tuberculosis.....	12		Whooping cough.....	36
Typhoid fever.....	11			
Whooping cough.....	14		WEST VIRGINIA.	
			Diphtheria.....	23
SOUTH DAKOTA.			Influenza:	
Chicken pox.....	12		Charleston.....	37
Diphtheria.....	14		Huntington.....	20
Dysentery.....	1		Mannington.....	25
Influenza.....	2		Princeton.....	42
Measles.....	10		Salem.....	32
Mumps.....	1		Scattering.....	36
Pneumonia.....	7		Scarlet fever.....	21
Scarlet fever.....	32		Typhoid fever.....	3
Smallpox.....				
Tuberculosis.....	8		WISCONSIN.	
Whooping cough.....	5		Milwaukee:	
			Cerebrospinal meningitis.....	1
TEXAS.			Chicken pox.....	23
Chicken pox.....	9		Diphtheria.....	24
Dengue.....	7		Influenza.....	30
Diphtheria.....	38		Measles.....	570
Influenza.....	390		Pneumonia.....	24
Measles.....	69		Scarlet fever.....	162
Pneumonia.....	6		Tuberculosis.....	15
Scarlet fever.....	17		Whooping cough.....	20
Smallpox.....	4		Scattering:	
Tuberculosis.....	11		Chicken pox.....	151
Typhoid fever.....	1		Diphtheria.....	84
Whooping cough.....	30		Influenza.....	144
			Measles.....	549
VERMONT.			Pneumonia.....	44
Chicken pox.....	51		Poliomyelitis.....	1
Diphtheria.....	1		Scarlet fever.....	178
Measles.....	15		Smallpox.....	36
Mumps.....	5		Tuberculosis.....	18
Pneumonia.....	1		Typhoid fever.....	6
Scarlet fever.....	20		Whooping cough.....	74
Smallpox.....	8			
Typhoid fever.....	1		WYOMING.	
Whooping cough.....	47		Chicken pox.....	4
			Mumps.....	1
			Smallpox.....	1

¹ Deaths.

Reports for Week Ended January 20, 1923.

NORTH DAKOTA.		TEXAS.							
	Cases.								
Chicken pox.....	12	Chicken pox.....							28
Diphtheria.....	24	Dengue.....							103
Influenza.....	4	Diphtheria.....							50
Measles.....	5	Influenza.....							237
Pneumonia.....	7	Measles.....							37
Scarlet fever.....	51	Mumps.....							1
Smallpox.....	15	Pellagra.....							10
Tuberculosis.....	2	Pneumonia.....							37
Typhoid fever.....	1	Scarlet fever.....							13
Whooping cough.....	12	Trachoma.....							7

Chicken pox.....	28
Dengue.....	103
Diphtheria.....	50
Influenza.....	237
Measles.....	37
Mumps.....	1
Pellagra.....	10
Pneumonia.....	37
Scarlet fever.....	13
Trachoma.....	7
Tuberculosis.....	106
Typhoid fever.....	12
Whooping cough.....	13

SUMMARY OF CASES REPORTED MONTHLY BY STATES.

The following summary of monthly State reports is published weekly and covers only those States from which reports are received during the current week:

State.	Cerebrospinal meningitis.	Diphtheria.	Influenza.	Malaria.	Measles.	Pellagra.	Poliomyelitis.	Scarlet fever.	Smallpox.	Typhoid fever.
<i>November, 1922.</i>										
Pennsylvania.....	6	2,419			10,082		4	1,866	1	313
<i>December, 1922.</i>										
Hawaii.....	1	28	136		528			3		8
Illinois.....	14	1,945	144	9	921	1	10	1,314	132	103
Indiana.....		765	27		572		1	464	82	67
Iowa.....	1	357			12		3	421	10	1
Kansas.....	1	511	33		101		1	578	18	15
Maryland.....		440	270		474	1	4	320		49
Minnesota.....	3	524	1		214		3	1,046	182	19
Mississippi.....		237	12,976	3,827	917	142		70	95	69
Montana.....		30	2		3			94	36	8
New Jersey.....	7	1,032	120		3,059		5	735		72
Oklahoma.....		60	24	17	2	1		39	59	12
Oregon.....		117	11		16			73	50	18
Pennsylvania.....	9	2,154			15,005		3	2,063	18	182
Rhode Island.....	2	78	1		505		1	52		6
South Carolina.....		203	3,013	11	9	7	1	17	60	6
Washington.....	4	85			19			158	121	25

CITY REPORTS FOR WEEK ENDED JANUARY 13, 1923.

CEREBROSPINAL MENINGITIS.

The column headed "Median for previous years" gives the median number of cases reported during the corresponding weeks of the years 1915 to 1922, inclusive. In instances in which data for the full eight years are incomplete, the median is that for the number of years for which information is available.

City.	Median for previous years.	Week ended Jan. 13, 1923.		City.	Median for previous years.	Week ended Jan. 13, 1923.	
		Cases.	Deaths.			Cases.	Deaths.
California:				Minnesota:			
Los Angeles.....	0	2	.....	Duluth.....	0		1
Connecticut:				New Jersey:			
Bridgeport.....	0	1	1	Jersey City.....	0	1	.....
New Haven.....	0	1	1	New York:			
District of Columbia:				Mount Vernon.....	0	1	
Washington.....	0	1	.....	New York.....	4	3	1
Illinois:				Ohio:			
Chicago.....	3	2	.....	Columbus.....	0	1	
Iowa:				East Youngstown.....			1
Waterloo.....	1	1	1	Pennsylvania:			
Maryland:				Philadelphia.....	1	2	.....
Baltimore.....	0	1	.....	Rhode Island:			
Massachusetts:				Providence.....	0		1
Everett.....	0	1	.....	Wisconsin:			
Michigan:				Milwaukee.....	1		1
Detroit.....	0		1				

February 2, 1923.

CITY REPORTS FOR WEEK ENDED JANUARY 13, 1923—Continued.
DENGUE.

City.	Cases.	Deaths.
Louisiana: New Orleans.....	2	.....

DIPHTHERIA.

See p. 215; also Current State summaries, p. 204; and Monthly summaries by States, p. 208.

INFLUENZA.

City.	Cases.		City.	Cases.		Deaths, week ended Jan. 13, 1923.
	Week ended Jan. 14, 1922.	Week ended Jan. 13, 1923.		Week ended Jan. 14, 1922.	Week ended Jan. 13, 1923.	
Alabama:			Massachusetts—Contd.			
Birmingham.....	63	7	Chelsea.....		5	1
Mobile.....	19	2	Dedham.....			1
Arizona:			Everett.....		28	1
Tucson.....		1	Fall River.....	2		
Arkansas:			Greenfield.....			1
Little Rock.....	49		Haverhill.....			
California:			Lawrence.....			1
Alameda.....	1		Newton.....	1	2	1
Berkeley.....	1		Northampton.....	1		
Los Angeles.....	3	11	Northbridge.....			1
Oakland.....		2	Pittsfield.....	1		
Riverside.....		1	Quincy.....		2	2
Sacramento.....		2	Springfield.....	1	3	2
San Francisco.....	3	8	Wakefield.....		2	
Santa Ana.....		1	Waltham.....		28	2
Stockton.....		3	Winthrop.....		1	
Colorado:			Woburn.....			1
Denver.....		4	Worcester.....	1		
Connecticut:			Michigan:			
Bridgeport.....	3	1	Detroit.....		21	4
Hartford.....	1		Grand Rapids.....		1	
New Britain.....	1		Highland Park.....		1	
Stonington.....		2	Jackson.....		1	
District of Columbia:			Marquette.....		2	
Washington.....	3	26	Minnesota:			
Florida:			Minneapolis.....			3
Tampa.....	1	3	Missouri:			
Georgia:			Kansas City.....	2	3	1
Atlanta.....	2		St. Louis.....		3	
Augusta.....	1		Springfield.....			3
Macon.....		23	Montana:			
Rome.....		90	Missoula.....	2		
Savannah.....		14	Nevada:			
Valdosta.....		1	Reno.....	3		
Illinois:			New Jersey:			
Chicago.....	24	37	Hackensack.....			
Decatur.....		1	Harrison.....		3	1
East St. Louis.....	1	3	Jersey City.....		1	
Jacksonville.....		1	Kearny.....	4	8	
Indiana:			Montclair.....		6	
Kokomo.....		1	Newark.....	19	22	
Kentucky:			Trenton.....	1	1	1
Louisville.....	1	39	New York:			
Louisiana:			Albany.....	5	18	
New Orleans.....	3	3	Amsterdam.....	15		
Maine:			Buffalo.....		3	4
Auburn.....	3	2	Jamesstown.....		26	
Maryland:			New York.....	37	143	14
Baltimore.....	23	88	Ulckskill.....		2	
Cumberland.....		6	Rochester.....			2
Massachusetts:			Rome.....			
Belmont.....	1		Saratoga Springs.....		3	
Boston.....	2	35	Schenectady.....		1	1
Cambridge.....	2	11	Yonkers.....		1	

CITY REPORTS FOR WEEK ENDED JANUARY 13, 1923—Continued.

INFLUENZA—Continued.

City.	Cases.		Deaths week ended Jan. 13, 1923.	City.	Cases.		Deaths week ended Jan. 13, 1923.
	Week ended Jan. 14, 1922.	Week ended Jan. 13, 1923.			Week ended Jan. 14, 1922.	Week ended Jan. 13, 1923.	
North Carolina:				South Dakota:			
Raleigh.....			5	Sioux Falls.....			1
Salisbury.....			1	Tennessee:			
Wilmington.....			1	Nashville.....			2
Winston-Salem.....			1	Texas:			
Ohio:				Corsicana.....			25
Akron.....	4	2		Dallas.....	2	2	
Chillicothe.....		1		Fort Worth.....	1		
Cincinnati.....		23	10	Utah:	Salt Lake City.....		1
Cleveland.....	8	25	4	Virginia:	Charlottesville.....	7	
Columbus.....			3	Danville.....		2	
Hamilton.....			1	Petersburg.....		11	2
Lancaster.....			1	Richmond.....		16	4
Norwood.....		3	1	Roanoke.....	2		2
Piqua.....	1			West Virginia:			
Toledo.....			1	Charleston.....		66	1
Oklahoma:				Fairmont.....		40	
Oklahoma.....			1	Huntington.....			6
Oregon:				Morgantown.....		2	
Portland.....			2				
Pennsylvania:							
Philadelphia.....	4	31	30				
South Carolina:							
Charleston.....		142	2				
Greenville.....		19					

LETHARGIC ENCEPHALITIS.

City.	Cases.	Deaths.	City.	Cases.	Deaths.
California:			Washington:		
San Francisco.....	1	1	Spokane.....		11
Ohio:			Vancouver.....	1	
Ashtabula.....	1	1			
Oregon:					
Portland.....	1	1			

MALARIA.

Alabama:			Louisiana:		
Mobile.....	2		New Orleans.....	1	
California:					
Alameda.....	1				

MEASLES.

See p. 215; also Current State summaries, p. 204; and Monthly summaries by States, p. 208.

PELLAGRA.

City.	Cases.	Deaths.	City.	Cases.	Deaths.
Alabama:			Texas:		
Birmingham.....	1	1	El Paso.....	1	
Georgia:			Waco.....		1
Atlanta.....		2			
Savannah.....	1	1			

February 2, 1923.

CITY REPORTS FOR WEEK ENDED JANUARY 13, 1923—Continued.

PNEUMONIA (ALL FORMS).

City.	Cases.	Deaths.	City.	Cases.	Deaths.
Alabama:			Kansas:		
Birmingham.....	24	12	Coffeyville.....	3	.....
Mobile.....	3	.....	Kansas City.....	11	.....
Montgomery.....	5	.....	Parsons.....	1	.....
Arizona:			Topeka.....	35	.....
Tucson.....	3	.....	Wichita.....	.....	.....
Arkansas:			Kentucky:		
Little Rock.....	9	.....	Covington.....	.....	9
California:			Henderson.....	.....	4
Berkeley.....	6	3	Lexington.....	.....	3
Long Beach.....	3	.....	Louisville.....	34	22
Los Angeles.....	58	24	New Orleans.....	13	11
Oakland.....	15	6	Maine:		
Pasadena.....	4	1	Biddeford.....	.....	3
Richmond.....	.....	1	Lewiston.....	.....	1
Riverside.....	3	.....	Portland.....	.....	2
Sacramento.....	5	.....	Sanford.....	.....	1
San Francisco.....	10	4	Maryland:		
Santa Barbara.....	.....	3	Baltimore.....	116	53
Santa Cruz.....	1	.....	Cumberland.....	.....	1
Stockton.....	2	.....	Frederick.....	2	1
Colorado:			Massachusetts:		
Denver.....	13	.....	Arlington.....	1	.....
Pueblo.....	2	.....	Attleboro.....	.....	2
Connecticut:			Belmont.....	3	.....
Bridgeport.....	12	6	Beverly.....	.....	1
Derby.....	.....	1	Boston.....	58	54
Greenwich.....	1	.....	Cambridge.....	16	7
Hartford.....	4	.....	Chelsea.....	5	1
Milford.....	1	.....	Clinton.....	.....	1
New Haven.....	13	.....	Danvers.....	1	.....
New London.....	2	.....	Everett.....	2	1
Orange.....	1	.....	Fall River.....	.....	11
Waterbury.....	3	.....	Fitchburg.....	.....	1
District of Columbia:			Framingham.....	.....	2
Washington.....	34	.....	Greenfield.....	.....	3
Florida:			Haverhill.....	5	1
St. Petersburg.....	1	.....	Holyoke.....	.....	3
Tampa.....	4	.....	Lawrence.....	7	1
Georgia:			Leominster.....	.....	2
Atlanta.....	42	.....	Lowell.....	5	4
Brunswick.....	2	.....	Lynn.....	7	3
Savannah.....	6	.....	Malden.....	.....	1
Valdosta.....	1	.....	Medford.....	.....	1
Illinois:			Melrose.....	.....	3
Alton.....	1	.....	Methuen.....	.....	3
Aurora.....	3	.....	New Bedford.....	.....	5
Centralia.....	1	.....	Newburyport.....	2	1
Champaign.....	1	.....	Newton.....	.....	5
Chicago.....	322	126	North Adams.....	.....	1
Decatur.....	11	1	Northampton.....	2	.....
East St. Louis.....	6	5	Plymouth.....	.....	2
Elgin.....	3	1	Quincy.....	.....	6
Evanston.....	3	.....	Somerville.....	5	2
Freeport.....	4	2	Springfield.....	4	3
Galesburg.....	3	2	Taunton.....	.....	2
Jacksonville.....	3	2	Wakefield.....	.....	1
Kewanee.....	1	.....	Waltham.....	6	2
Mattoon.....	4	2	Watertown.....	1	.....
Oak Park.....	2	1	Webster.....	1	.....
Peoria.....	.....	9	Winthrop.....	4	2
Quincy.....	1	.....	Worcester.....	.....	6
Springfield.....	8	3	Michigan:		
Indiana:			Alpena.....	1	.....
Anderson.....	2	.....	Ann Arbor.....	5	.....
Bloomington.....	2	.....	Battle Creek.....	5	1
East Chicago.....	5	.....	Detroit.....	122	64
Gary.....	5	.....	Flint.....	.....	6
Hammond.....	4	.....	Grand Rapids.....	9	5
Indianapolis.....	18	.....	Hamtramck.....	.....	2
Kokomo.....	2	.....	Highland Park.....	8	.....
Laporte.....	2	.....	Jackson.....	1	.....
Mishawaka.....	3	.....	Kalamazoo.....	1	.....
Muncie.....	2	.....	Marquette.....	1	.....
South Bend.....	1	.....	Muskegon.....	5	2
Terre Haute.....	4	.....	Pontiac.....	10	.....
Iowa:			Port Huron.....	.....	3
Burlington.....	2	1	Saginaw.....	1	.....
Council Bluffs.....	.....	3			

CITY REPORTS FOR WEEK ENDED JANUARY 13, 1923—Continued.

PNEUMONIA (ALL FORMS)—Continued.

City.	Cases.	Deaths.	City.	Cases.	Deaths.
Minnesota:			Ohio—Continued.		
Duluth.....	2		Cincinnati.....		30
Faribault.....	1		Cleveland.....	70	34
Minneapolis.....	16		Cleveland Heights.....	1	
St. Paul.....	7		Columbus.....		22
Winona.....	2		Hamilton.....		1
Missouri:			Lancaster.....		3
Kansas City.....	31	14	Lorain.....	1	
St. Joseph.....	5		Mansfield.....	4	
Springfield.....	4		New Philadelphia.....	1	
Montana:			Newark.....		3
Billings.....		1	Niles.....		1
Butte.....	4		Norwood.....		1
Great Falls.....		1	Piqua.....	5	
Helena.....		2	Sandusky.....	2	1
Missoula.....	3	2	Springfield.....		7
Nebraska:			Tiffin.....	1	
Lincoln.....		3	Toledo.....		4
Omaha.....	20		Youngstown.....		4
New Hampshire:			Zanesville.....	1	
Concord.....		1	Oklahoma:		
Nashua.....		1	Oklahoma.....		7
New Jersey:			Oregon:		
Atlantic City.....	3	1	Portland.....		9
Bayonne.....	1		Pennsylvania:		
Clifton.....	2		Philadelphia.....	203	153
East Orange.....	9		Rhode Island:		
Elizabeth.....		6	Newport.....		2
Garfield.....	4	2	Providence.....		9
Hackensack.....		1	South Carolina:		
Harrison.....	1		Charleston.....		11
Hoboken.....		5	Greenville.....		2
Jersey City.....	4		South Dakota:		
Kearny.....	2	1	Sioux Falls.....	1	
Montclair.....	4	1	Tennessee:		
Morrisstown.....	5	2	Memphis.....		15
Newark.....	74	17	Nashville.....		14
Orange.....		6	Texas:		
Passaic.....		3	Beaumont.....		1
Paterson.....	25		Corpus Christi.....		1
Perth Amboy.....		1	Dallas.....		8
Plainfield.....	8	1	El Paso.....	4	3
Summit.....		1	Fort Worth.....		9
Trenton.....	10	9	Galveston.....		1
West Hoboken.....		2	Houston.....		11
West New York.....		1	San Antonio.....		4
West Orange.....	2		Waco.....		1
New York:			Utah:		
Albany.....	23		Salt Lake City.....		8
Amsterdam.....	2		Vermont:		
Auburn.....	2	1	Burlington.....		1
Buffalo.....	47	23	Virginia:		
Cohoes.....		1	Alexandria.....		2
Hudson.....	4		Charlottesville.....		1
Ithaca.....		1	Lynchburg.....		2
Jamestown.....	6		Norfolk.....		7
Lockport.....	2		Petersburg.....		1
Mount Vernon.....	6	2	Portsmouth.....		2
New York.....	391	181	Richmond.....		5
Niagara Falls.....		5	Roanoke.....	7	3
Olean.....	5	1	West Virginia:		
Port Chester.....	3	2	Bluefield.....		2
Rochester.....	20	10	Charleston.....		3
Rome.....	2	1	Huntington.....		3
Saratoga Springs.....	1		Parkersburg.....		1
Schenectady.....	4	1	Wheeling.....		3
Watertown.....	9		Wisconsin:		
White Plains.....		2	Ashland.....		1
Yonkers.....		1	Beloit.....	2	
North Carolina:			Fond du Lac.....	2	
Durham.....		2	Jamesville.....		1
Greensboro.....		2	Kenosha.....		2
Raleigh.....		2	Madison.....		1
Rocky Mount.....		2	Marinette.....		2
Wilmington.....		2	Oshkosh.....		2
Winston-Salem.....		4	Racine.....		3
Ohio:			Sheboygan.....		2
Akron.....	9		Superior.....		1
Barberton.....	2		Wyoming:		
Canton.....		5	Cheyenne.....		1
Chillicothe.....	1				

February 2, 1923.

CITY REPORTS FOR WEEK ENDED JANUARY 13, 1923—Continued.**POLIOMYELITIS (INFANTILE PARALYSIS).**

The column headed "Median for previous years" gives the median number of cases reported during the corresponding weeks of the years 1915 to 1922, inclusive. In instances in which data for the full eight years are incomplete, the median is that for the number of years for which information is available.

City.	Median for pre- vious years.	Week ended Jan. 13, 1923.		City.	Median for pre- vious years.	Week ended Jan. 13, 1923.	
		Cases.	Deaths.			Cases.	Deaths.
Massachusetts:				New York—Continued.			
Boston.....	0	1	.....	New York.....	1	1	.....
Waltham.....	0	1	.....	Pennsylvania:			
Minnesota:				Pittsburgh.....	0	1	.....
St. Paul.....	0	1	.....	Washington.....	0	1	.....
New York:				Tacoma.....			
Jamestown.....	0	1	.....			

RABIES IN ANIMALS.

City.	Cases.	City.	Cases.
California:		Massachusetts—Continued.	
Los Angeles.....	11	Holyoke.....	1
Pasadena.....	1	Missouri:	
Georgia:		Kansas City.....	1
Savannah.....	2	Texas:	
Massachusetts:		Beaumont.....	3
Arlington.....	1		

SCARLET FEVER.

See p. 215; also Current State summaries, p. 204; and Monthly summaries, by States, p. 208.

SMALLPOX.

The column headed "Median for previous years" gives the median number of cases reported during the corresponding weeks of the years 1915 to 1922, inclusive. In instances in which data for the full eight years are incomplete, the median is that for the number of years for which information is available.

City.	Median for pre- vious years.	Week ended Jan. 13, 1923.		City.	Median for pre- vious years.	Week ended Jan. 13, 1923.	
		Cases.	Deaths.			Cases.	Deaths.
Alabama:				Iowa:			
Mobile.....	0	1	.....	Council Bluffs.....	1	2	.....
California:				Davenport.....	1	3	.....
Los Angeles.....	2	7	.....	Des Moines.....	6	4	.....
Oakland.....	0	4	.....	Marshalltown.....	2	1	.....
Colorado:				Waterloo.....	0	1	.....
Denver.....	8	1	2	Kansas:			
Florida:				Lawrence.....	1	1	.....
St. Petersburg.....	2			Salina.....	0	1	.....
Georgia:				Michigan:			
Valdosta.....	0	1	.....	Battle Creek.....	1	1	.....
Illinois:				Detroit.....	6	6	.....
Champaign.....	0	1	.....	Grand Rapids.....	1	1	.....
Freeport.....	0	6	.....	Minnesota:			
Kewanee.....	0	1	.....	Duluth.....	1	7	.....
Indiana:				Minneapolis.....	15	9	.....
East Chicago.....	0	1	.....	St. Paul.....	25	18	.....
Elwood.....	0	2	.....	Missouri:			
Gary.....	0	4	.....	Joplin.....	0	1	.....
Indianapolis.....	1	6	.....	St. Joseph.....	3	1	.....
Kokomo.....	0	1	.....	Montana:			
Laporte.....	1			Great Falls.....	1	2	.....
Muncie.....	1	1	.....			

CITY REPORTS FOR WEEK ENDED JANUARY 13, 1923—Continued.

SMALLPOX—Continued.

City.	Median for pre- vious years.	Week ended Jan. 13, 1923.		City.	Median for pre- vious years.	Week ended Jan. 13, 1923.	
		Cases.	Deaths.			Cases.	Deaths.
Nebraska:				South Dakota:			
Omaha.....	6	3	.....	Sioux Falls.....	2	1	.....
New York:				Tennessee:			
Jamestown.....	0	21	.....	Knoxville.....	0	6	.....
Niagara Falls.....	0	4	.....	Memphis.....	0	5	.....
North Carolina:				Texas:			
Raleigh.....	0	1	.....	El Paso.....	0	1	.....
Winston-Salem.....	1	15	.....	Utah:			
Ohio:				Salt Lake City.....	5	4	.....
Dayton.....	0	3	.....	Washington:			
Lancaster.....	0	1	.....	Hoquiam.....	.....	1	.....
Piqua.....	0	1	.....	Seattle.....	5	3	.....
Sandusky.....	0	2	.....	Tacoma.....	0	1	.....
Steubenville.....	0	1	.....	Vancouver.....	1	1	.....
Toledo.....	3	3	.....	West Virginia:			
Oregon:				Bluefield.....	1	1	.....
Portland.....	5	8	.....	Parkersburg.....	0	1	.....
Pennsylvania:				Wisconsin:			
Philadelphia.....	0	2	.....	Green Bay.....	0	1	.....
South Carolina:				Stevens Point.....	.....	3	.....
Greenville.....	0	1	.....	Superior.....	1	33	.....

TETANUS.

City.	Cases.	Deaths.	City.	Cases.	Deaths.
Alabama:			New York:		
Birmingham.....	1	1	New York.....	1	1
Mobile.....	.....	1	Pennsylvania:		
Georgia:			Philadelphia.....	1	1
Savannah.....	1	1	Tennessee:		
Missouri:			Nashville.....	.....	1
St. Louis.....	1	.....	Texas:		
			Galveston.....	.....	1

TUBERCULOSIS.

See p. 215, also Current State summaries, p. 204.

TYPHOID FEVER.

The column headed "Median for previous years," gives the median number of cases reported during the corresponding weeks of the years 1915 to 1922, inclusive. In instances in which data for the full eight years are incomplete, the median is that for the number of years for which information is available.

City.	Median for pre- vious years.	Week ended Jan. 13, 1923.		City.	Median for pre- vious years.	Week ended Jan. 13, 1923.	
		Cases.	Deaths.			Cases.	Deaths.
Alabama:				Illinois:			
Birmingham.....	2	1	.....	Chicago.....	4	4	.....
Arkansas:				Indiana:			
Little Rock.....	0	2	.....	Anderson.....	0	2	.....
California:				Indianapolis.....	0	1	.....
Los Angeles.....	1	2	.....	Iowa:			
Oakland.....	0	2	.....	Sioux City.....	0	1	.....
Riverside.....	0	1	.....	Kansas:			
Colorado:				Wichita.....	0	1	.....
Trinidad.....	0	.....	Kentucky:				
Florida:				Louisville.....	1	2	1
Tampa.....	0	3	.....	Louisiana:			
Georgia:				New Orleans.....	1	9	3
Atlanta.....	1	.....				

February 2, 1923.

CITY REPORTS FOR WEEK ENDED JANUARY 13, 1923—Continued.

TYPHOID FEVER—Continued.

City.	Median for pre- vious years.	Week ended Jan. 13, 1923.		City.	Median for pre- vious years.	Week ended Jan. 13, 1923.	
		Cases.	Deaths.			Cases.	Deaths.
Maine:				Ohio:			
Portland.	0	1	—	Cleveland.	3	2	2
Maryland:				Columbus.	0	1	—
Baltimore.	3	2	2	Youngstown.	0	2	1
Massachusetts:				Zanesville.	0	1	—
Fall River.	1	—	1	Oklahoma:			
Fitchburg.	0	1	—	Oklahoma.	0	—	1
Lynn.	0	1	1	Pennsylvania:			
Medford.	0	1	—	Chester.	0	1	—
Michigan:				Johnstown.	0	5	—
Grand Rapids.	0	—	1	McKeesport.	0	2	—
Muskegon.	0	1	—	New Kensington.	0	1	—
Saginaw.	0	1	—	Philadelphia.	3	5	—
Minnesota:				Pittsburgh.	3	2	—
Rochester.	0	1	—	South Carolina:			
Missouri:				Columbia.	0	1	—
St. Louis.	2	5	1	Texas:			
Montana:				El Paso.	0	1	—
Billings.	0	2	—	Virginia:			
Nebraska:				Portsmouth.	0	1	—
Omaha.	0	1	—	Richmond.	0	1	—
New Jersey:				Washington:			
Newark.	0	1	—	Tacoma.	1	1	—
Orange.	0	1	—	West Virginia:			
New York:				Bluefield.	0	—	1
Buffalo.	2	—	1	Wheeling.	0	1	—
New York.	15	14	3	Wisconsin:			
Rochester.	0	1	—	Kenosha.	0	1	—
North Carolina:				Milwaukee.	1	1	—
Greensboro.	0	—	1				

DIPHTHERIA, MEASLES, SCARLET FEVER, AND TUBERCULOSIS.

City.	Popula- tion Jan. 1, 1920.	Total deaths from all causes.	Diphtheria.		Measles.		Scarlet fever.		Tuber- culosis.	
			Cases.	Deaths.	Cases.	Deaths.	Cases.	Deaths.	Cases.	Deaths.
Alabama:										
Birmingham.	178,806	65	6	1	2	—	1	—	24	4
Mobile.	60,777	27	2	1	—				4	1
Montgomery.	43,464	15	—						—	
Tuscaloosa.	11,996	—	1	—					—	
Arizona:										
Tucson.	20,292	20	—						6	—
Arkansas:										
Hot Springs.	11,695	4	—						—	
Little Rock.	65,142	—	3	—					3	—
North Little Rock.	11,098	—	—		1	—			—	
California:										
Alameda.	28,806	7	2	—					—	
Berkeley.	56,036	15	—		1	—	6	2	3	—
Long Beach.	55,593	19	3	9	9	—	3	1	1	—
Los Angeles.	576,673	245	57	1	13	—	30	1	76	30
Oakland.	216,261	55	12	—	1	—	3	4	2	—
Pasadena.	45,354	16	1	—	1	—	—		3	—
Richmond.	16,843	2	—		—		1	—	—	
Riverside.	19,341	12	3	1	—		4	—	1	—
Sacramento.	65,908	21	2	—	2	—	5	4	5	—
San Bernardino.	18,721	11	—		—		1	—	3	—
San Diego.	74,683	16	6	—	12	—	16	1	2	—
San Francisco.	506,676	153	37	3	4	—	15	1	29	17
Santa Ana.	15,485	7	2	—	1	—	2	—	—	1
Santa Barbara.	19,441	8	—		—				—	
Santa Cruz.	10,917	2	—		—				—	
Stockton.	40,296	13	6	—	—			2	—	1
Vallejo.	21,107	0	1	—	—			—	—	
Colorado:										
Denver.	236,491	84	36	1	5	—	31	—	6	—
Pueblo.	43,050	9	3	—	—		2	—	—	
Trinidad.	10,906	—	1	1	—		1	—	—	

CITY REPORTS FOR WEEK ENDED JANUARY 13, 1923—Continued.

DIPHTHERIA, MEASLES, SCARLET FEVER, AND TUBERCULOSIS—Continued.

City.	Population Jan. 1, 1920.	Total deaths from all causes.	Diphtheria.		Measles.		Scarlet fever.		Tuberculosis.	
			Cases.	Deaths.	Cases.	Deaths.	Cases.	Deaths.	Cases.	Deaths.
Connecticut:										
Bridgeport	143,535	35	6		63		16		12	4
Bristol	20,620	3			13					
Derby	11,238	3								
Fairfield (town)	11,475	0	4		39		2			
Greenwich (town)	22,123				2					
Hartford	138,036	33	17	1	8		5		4	1
Manchester (town)	18,370	2	2				1		1	
Milford (town)	10,193	3			1					
New Haven	162,537	50	4		55		8		3	
New London	25,688	13	2							12
Stonington (town)	10,236	3	1		3		1			
Waterbury	91,715	20	4		5		13		1	2
District of Columbia:										
Washington	437,571	163	26	2	20		29		20	9
Florida:										
St. Petersburg	14,237	5			1					1
Tampa	51,608	23	3	1			2		1	3
Georgia:										
Atlanta	200,616	102	6				6			2
Brunswick	14,413	2							2	1
Macon	52,995	6	2		10		2		2	
Rome	13,252		1							
Savannah	82,252	42	3				1		2	1
Valdosta	10,783	3	1							
Idaho:										
Boise	21,393	2	1				2			
Pocatello	15,001	3								
Illinois:										
Alton	24,682	7	5				3		2	2
Aurora	36,397	19	11	2	2		2		4	
Centralia	12,491	5								
Champaign	15,873		3		2		1			
Chicago	2,701,705	812	183	20	192	2	114	2	130	50
Decatur	43,818	10	2				3			
East St. Louis	66,767	19	1		1		1		2	2
Elgin	27,454	5					1			
Evanston	37,234	10	2		8		1		1	
Forest Park	10,768		1							
Freeport	19,669	6	2	1	1		1			
Galesburg	23,534	8			1				1	
Jacksonville	15,713	11	2				1			
Kewanee	16,026	6	1							
La Salle	13,050	7			22				1	
Mattoon	13,552	8	1							
Oak Park	39,858	15	3		6		2			
Peoria	70,121	31					11	1		
Quincy	35,978	6								
Springfield	59,183	24	8		15		3		3	2
Indiana:										
Anderson	29,767	9	2		2					
Bloomington	11,595	5								
Crawfordsville	10,139	2					1			
East Chicago	35,967	14	1				1			
Elwood	10,790	8					1			
Frankfort	11,385									
Gary	55,378	16	2	1			4			1
Hammond	36,004	8			2		3			
Huntington	14,000	3	1							
Indianapolis	314,194	110	28	4	1		7		4	3
Kokomo	30,067	8	2				1			1
La Fayette	22,486	9					2		1	
Laporte	15,158	3	2						2	
Logansport	21,626	3								
Mishawaka	15,195	9	1		23		3		1	
Muncie	30,524	11	3							1
South Bend	70,983	8	1		65		6		1	
Terre Haute	06,083	18	6		1		3			
Iowa:										
Burlington	24,057	8	2						2	
Cedar Rapids	45,596		1				2			
Clinton	24,151		8							
Council Bluffs	36,162	9								
Davenport	56,727		6		1					
Des Moines	126,468		6	1			27	1		

February 2, 1923.

CITY REPORTS FOR WEEK ENDED JANUARY 13, 1923—Continued.

DIPHTHERIA, MEASLES, SCARLET FEVER, AND TUBERCULOSIS—Continued.

City.	Population Jan. 1, 1920.	Total deaths from all causes.	Diphtheria.		Measles.		Scarlet fever.		Tuber- culosis.	
			Cases.	Deaths.	Cases.	Deaths.	Cases.	Deaths.	Cases.	Deaths.
Iowa—Continued.										
Dubuque.	39,141				21		1			
Iowa City.	11,267						2			
Marshalltown.	15,731									
Mason City.	20,065	5	5							
Muscatine.	16,038	9					1			
Ottumwa.	23,003		1				1			
Sioux City.	71,227	1	2				3			
Waterloo.	36,230	1					3			
Kansas:										
Atchison.	12,630		1				2	2		
Coffeyville.	13,452	3								
Hutchinson.	23,298									
Kansas City.	101,177		3		2		8			
Lawrence.	12,456	5	3							
Leavenworth.	16,912		1							
Parsons.	16,028	5			1					
Salina.	15,085	3					1			
Topeka.	50,022	28	7	1	2		4	1	5	3
Wichita.	72,247	31	25	1						
Kentucky:										
Covington.	57,121	32	4				1			3
Henderson.	12,169	4			15					
Lexington.	41,534	23	6				1			2
Louisville.	234,891	89	12		1		1		16	6
Paducah.	24,735				72					
Louisiana:										
New Orleans.	387,219	124	23	3			3		23	15
Maine:										
Auburn.	16,985	3					12			
Bath.	14,731	0								
Biddeford.	18,008	7								
Lewiston.	31,791	8								
Portland.	69,272	11	5		30					
Sanford (town).	10,691	3								
Waterville.	13,351									
Maryland:										
Baltimore.	733,826	275	40	6	48		35		30	28
Cumberland.	29,837	10			9					2
Frederick.	11,036	8								
Massachusetts:										
Adams (town).	12,967	3						1		
Amesbury (town).	10,036	4	1							
Arlington (town).	18,665	4					3			
Attleboro.	19,731	10			13					
Belmont (town).	10,739	3			3					
Beverly.	22,561	7			1					
Boston.	748,060	265	75	7	53	1	56		41	11
Brantree (town).	10,580	3			7		3			
Brookline.	37,748	9			1		1			
Cambridge.	109,694	30	6		24		8		3	4
Chelsea.	43,184	24			25		5		3	2
Chicopee.	36,214	4	1				1	1		
Clinton.	12,979	3								
Danvers.	11,108		1		1					
Dedham.										
Everett.	10,792	5								
Fall River.	40,120	5	2		15		1			
Fitchburg.	120,485	54	13		56	5	3	1	1	
Framingham.	41,029	13	7	1	1					
Gardner.	17,033	8			1					
Greenfield.	16,971	3					1			
Haverhill.	15,462				1					
Holyoke.	53,884	21	2		3		3		1	1
Lawrence.	60,203	20	3				3		2	1
Leominster.	94,270	29	2	1	2		1		1	1
Lowell.	19,744	5					2			
Lynn.	112,759	41	2		13		3		3	3
Malden.	99,148	26	2		125		3		3	
Medford.	49,103	11	4				3		4	1
Melrose.	39,038	8			4		1			
Methuen.	18,204	7	1				5			
Milford.	15,189	5			2					
New Bedford.	13,471	0								
Newburyport.	121,217	35	4		285	3	6		8	2
		15,618	5		13					

CITY REPORTS FOR WEEK ENDED JANUARY 13, 1923—Continued.
DIPHTHERIA, MEASLES, SCARLET FEVER, AND TUBERCULOSIS—Continued

February 2, 1923.

CITY REPORTS FOR WEEK ENDED JANUARY, 13, 1923—Continued.

DIPHTHERIA, MEASLES, SCARLET FEVER, AND TUBERCULOSIS—Continued.

City.	Population Jan. 1, 1920.	Total deaths from all causes.	Diphtheria.		Measles.		Scarlet fever.		Tuber- culosis.	
			Cases.	Deaths.	Cases.	Deaths.	Cases.	Deaths.	Cases.	Deaths.
New Jersey:										
Asbury Park.	12,400	2								
Atlantic City.	50,707	13			61		1			
Bayonne.	76,754		2		10		11		2	
Bloomfield.	22,019	2			17	1	2			
Clifton.	26,470	3			20		1			
East Orange.	50,710				122	2	6		2	
Elizabeth.	93,783		8		4		3			
Englewood.	11,627	1			6		1			
Garfield.	19,381	6								
Hackensack.	17,667	7	5							
Harrison.	15,721				1					
Hoboken.	68,166	22	1	1			1		3	
Jersey City.	298,103		30		1		11		10	
Kearny.	26,724	6	2		1				1	
Long Branch.	13,521	3	2						1	
Montclair.	28,810	5			2		2			
Morristown.	12,548	6	1		60					
Newark.	414,524	120	34	3	160	2	19		24	5
Orange.	33,268	14	1		10		2		1	
Passaic.	63,841	16	2		21		4		1	1
Paterson.	135,575		9		6		5		2	
Perth Amboy.	41,707	5	2				7		2	
Phillipsburg.	16,923	3	1							
Plainfield.	27,700	7			4					
Summit.	10,174	3					1			
Trenton.	119,289	44	36	4	1		24		3	5
Union (town).	20,651				1		2			
West Hoboken.	40,074	4	1				1			
West New York.	29,925	7	1		1					
West Orange.	15,573	4			23		3			
New Mexico:										
Albuquerque.	15,157	5		1					1	
New York:										
Albany.	113,344		4		1		5		5	.
Amsterdam.	33,524	1	1						1	.
Auburn.	36,192	9	3	1					1	.
Buffalo.	506,775	157	18	2	131	1	25		20	7
Cohoes.	22,987	5	1							
Geneva.	14,648	3								
Hornell.	15,025	4							1	.
Hudson.	11,745	4								
Ithaca.	17,004	7					2			
Jamestown.	38,917	9			2		3			
Lockport.	21,308	1					1			
Mount Vernon.	42,726	16	1		33	1	2			1
New York.	5,620,048	1,430	237	17	221	5	238	3	1,300	1,106
Niagara Falls.	50,760	18	7		1		2		3	1
North Tonawanda.	15,482	6								
Olean.	20,506	9	1		13		4		1	
Peekskill.	15,868	2					5			
Port Chester.	16,573	4								
Rochester.	295,750	64	6	1	96		9		15	2
Rome.	26,341	11	1		1		2			
Saratoga Springs.	13,181	1					1		2	
Schenectady.	88,723	23	3				13		6	1
Watertown.	31,285	11	1							
White Plains.	21,031	5			1		5		3	
Yonkers.	100,176	19	2	1	6		5		1	
North Carolina:										
Durham.	21,719	8	1						1	1
Greensboro.	15,861	12								
Raleigh.	24,418	22	1		1					1
Rocky Mount.	12,742	6								
Salisbury.	13,884	5								
Wilmington.	33,372	10	1							
Winston-Salem.	48,395	19	1				1		1	1
North Dakota:										
Fargo.	21,961	1					2	1		
Grand Forks.	14,010						1			
Ohio:										
Akron.	208,435	32	11		5		10		1	
Ashtabula.	22,082	7	1							

¹ Pulmonary tuberculosis only.

CITY REPORTS FOR WEEK ENDED JANUARY 13, 1923—Continued.
DIPHTHERIA, MEASLES, SCARLET FEVER, AND TUBERCULOSIS—Continued.

City,	Population Jan. 1, 1920.	Total deaths from all causes.	Diphtheria.		Measles.		Scarlet fever.		Tuber- culosis.	
			Cases.	Deaths.	Cases.	Deaths.	Cases.	Deaths.	Cases.	Deaths.
Ohio—Continued										
Barberton	18,811	2	1				2			
Bucyrus	10,425	1			3					
Cambridge	13,104	4	4		3		1			
Canton	87,001	11	5		1		5			
Chillicothe	15,831	5					2		1	
Cincinnati	401,247	157	18	1	12		24	3	19	
Cleveland	796,841	210	58	5	60		146	3	45	12
Cleveland Heights	15,236		1		1		3		1	
Columbus	237,031	105	12		10		6		3	
Coshocton	10,847				2		1			
Dayton	152,559	48	5		1		9			
East Youngstown	11,237	1								
Findlay	17,021	6			42					
Fremont	12,468	4								
Hamilton	39,675	14			11					
Kenmore	12,683		3		2		1		1	
Lancaster	14,706	7	3							
Lorain	37,295		3		23		1		2	
Mansfield	27,824	4	4		46		3			
Marion	27,891				1		1			
Martins Ferry	11,634	7	2		14					
New Philadelphia	10,718		1		1					
Newark	26,718	10	1				1			
Niles	13,080	1	1							
Norwood	24,966	5	1				1			
Piqua	15,044	6	1		1					
Salem	10,305	5	2							
Sandusky	22,897	5	2							
Springfield	60,840	24	6	1	2		3		1	3
Steubenville	28,508	11								
Tiffin	14,375	9								
Toledo	243,164	72	14	2	482	3	20		3	6
Youngstown	132,358	20	22			6	6		1	3
Zanesville	29,569	9		1	21				1	
Oklahoma:										
Oklahoma	91,295	32	4		2		6			1
Oregon:										
Portland	258,288	52	8	1	1		4		11	4
Pennsylvania:										
Allentown	73,502		8		81		7		1	
Altoona	60,331		5		39					
Ambridge	12,730		2		6					
Beaver Falls	12,802				7					
Berwick	12,181		3				2		3	
Bethlehem	50,358		12		3		4		5	
Braddock	20,879				2		1			
Bradford	15,525									
Bristol	10,273		8		2					
Canonsburg	10,632				4					
Carbondale	18,640		1							
Carnegie	11,516		1		24					
Carrick	10,504				1					
Chambersburg	13,171				4		3			
Chester	58,030		1		47		1			
Cotesville	14,515				10					
Columbia	10,836		1		25		1			
Countryside	13,804		2				1			
Dickson	11,049		2		5					
Donora	14,131		1		1					
Dubois	13,681		1							
Duquesne	19,011		1		65					
Easton	33,813		2		6					
Erie	93,372		8		2		17		6	
Farrell	15,386				6		2		1	
Greensburg	15,033		1		15		1			
Harrisburg	75,917		7		74		4			
Hazelton	32,277		1		1					
Homestead	20,452		1		10					
Jeannette	10,627				1					
Johnstown	67,327		1		4		7			
Lancaster	53,150		1		19		23		1	
Lebanon	24,643		3		34					
McKees Rocks	16,713		6		16					
McKeesport	46,781				8		3			

February 2, 1923.

CITY REPORTS FOR WEEK ENDED JANUARY 13, 1923—Continued.

DIPHTHERIA, MEASLES, SCARLET FEVER, AND TUBERCULOSIS—Continued.

City.	Popula-tion Jan. 1, 1920.	Total deaths from all causes:	Diphtheria.		Measles.		Scarlet fever.		Tuber-cu-lo-sis.	
			Cases.	Deaths.	Cases.	Deaths.	Cases.	Deaths.	Cases.	Deaths.
Pennsylvania—Continued.										
Mahony City.....	15,599				2					
Meadville.....	14,568		1	1			1			
Monessen.....	18,179		2							
Mount Carmel.....	17,369		1		1					
New Castle.....	44,938		1							
New Kensington.....	11,987		1		3		1			
Norristown.....	32,319				66		1			
Oil City.....	21,274				11				2	
Philadelphia.....	1,823,779	729	74	12	1,012	40	61		88	48
Phoenixville.....	10,484				47					
Pittsburgh.....	588,343		31		328		45		16	
Pittston.....	18,497		1		6					
Plymouth.....	16,500		1							
Pottstown.....	17,431				9					
Pottsville.....	21,876		1	2					1	
Reading.....	107,784		9		160				2	
Scranton.....	137,783		11		57		1			
Shamokin.....	21,204		1		3				1	
Sharon.....	21,747				2					
Shenandoah.....	24,726		2							
Steelton.....	13,428				37					
Sunbury.....	15,721				1					
Swissvale.....	10,908				9					
Tamaqua.....	12,363				8					
Washington.....	21,480							2		
West Chester.....	21,717		2		51		4			
Wilkes-Barre.....	73,833		2				1			
Wilkinsburg.....	24,403				12		1			
Williamsport.....	36,198		1				1			
Woodlawn.....	12,495		1		18		1		2	
York.....	47,512				4		8		1	
Rhode Island:										
Newport.....	30,255	5								
Pawtucket.....	64,248	14			3				1	
Providence.....	237,595	81	7	4	92	2	8		3	
South Carolina:										
Charleston.....	67,957	38	3						1	
Greenville.....	23,127	6			1				1	
South Dakota:										
Sioux Falls.....	25,202	6	1				3			
Tennessee:										
Knoxville.....	77,818						2		5	5
Memphis.....	162,351	70	5		117		2		11	3
Nashville.....	118,342	61	3		2		3		6	5
Texas:										
Beaumont.....	40,422	11	3		1				1	2
Corpus Christi.....	10,522	3	2							
Corsicana.....	11,356	7							1	
Dallas.....	158,976	45	7				3		6	2
El Paso.....	77,560	39			36	1			82	12
Fort Worth.....	106,482	29	4				3		2	2
Galveston.....	44,255	15	5				3		1	2
Houston.....	138,276	41	5						1	
San Antonio.....	161,379	48	1				1			9
Waco.....	38,500	12								
Utah:										
Salt Lake City.....	118,110	32	11	1	1		4		1	
Vermont:										
Barre.....	10,008						1			
Burlington.....	22,779	7					2			
Rutland.....	14,954	1								
Virginia:										
Alexandria.....	18,060	6							1	
Charlottesville.....	10,688	3	1						2	
Danville.....	21,539	8						2		
Lynchburg.....	30,070	11	4	1	4		6		1	1
Norfolk.....	115,777			9					7	3
Petersburg.....	31,012	8						4		
Portsmouth.....	54,387	10	1		1		1			1
Richmond.....	171,667	61	5		1		15		17	7
Roanoke.....	50,842	17	7		3				2	1

CITY REPORTS FOR WEEK ENDED JANUARY, 13, 1923—Continued.
DIPHTHERIA, MEASLES, SCARLET FEVER, AND TUBERCULOSIS—Continued.

City.	Popula- tion Jan. 1, 1920.	Total deaths from all causes.	Diphtheria.		Measles.		Scarlet fever.		Tuber- culosis.	
			Cases.	Deaths.	Cases.	Deaths.	Cases.	Deaths.	Cases.	Deaths.
Washington:										
Bellingham.....	25,583		1				1			
Everett.....	27,644				1					
Seattle.....	315,312	3			5		12			
Spokane.....	104,437	2								
Tacoma.....	96,965	3			2		8			
Vancouver.....	12,637						2			
Yakima.....	18,539						3			
West Virginia:										
Bluefield.....	15,282	5					3			
Charleston.....	39,608	18	3		6		1			
Clarksburg.....	27,869	2	3		1					
Fairmont.....	17,851		6				4			
Huntington.....	50,177	25	3				1			
Martinsburg.....	12,515				1					
Morgantown.....	12,127		2		2		2			
Moundsville.....	10,660	3	2		2					
Parkersburg.....	20,050	6	2							
Wheeling.....	56,208	14	1		83		13			2
Wisconsin:										
Appleton.....	19,561	8	4							1
Ashland.....	11,334	5								1
Beloit.....	21,284	4	2		4		12			1
Eau Claire.....	20,900		1		1		1			1
Fond du Lac.....	23,427	3	2				1			
Green Bay.....	31,017				2					
Janesville.....	18,203	6			25		1			
Kenosha.....	40,472	8	3	1	106					
La Crosse.....	30,421				24		12			3
Madison.....	38,378	3	1		2		5			
Manitowoc.....	17,563		2							
Marinette.....	13,610	9					2			
Milwaukee.....	457,147	121	28	1	942		137	1	16	3
Oshkosh.....	33,162	10					1			
Racine.....	58,593	8	1		19		6		1	
Sheboygan.....	30,955	11	8						11	
Stevens Point.....	11,371						1			
Superior.....	39,671	6	1							
Wausau.....	18,661						2		2	
West Allis.....	13,745	1	2		12		7		1	1
Wyoming:										
Cheyenne.....	13,820	8					1		2	2

FOREIGN AND INSULAR.

AZORES.

Plague—Island of Fayal.¹

Under date of December 30, 1922, plague was reported with several cases at Castelo Branco, Island of Fayal, Azores.

CUBA.

Communicable Diseases—Habana.

Communicable diseases have been notified at Habana as follows:

Disease.	Jan. 1-10, 1923.		Remaining under treatment Jan. 10, 1922.
	New cases.	Deaths.	
Chicken pox.....	3		3
Diphtheria.....	2		3
Leprosy.....			10
Malaria.....	32	1	147
Measles.....	1		2
Paratyphoid fever.....			5
Scarlet fever.....	3		2
Typhoid fever.....	17	2	79

¹ From the interior, 25; from abroad, 2.

² From the interior, 18; from abroad, 1.

Quarantine Disinfection Measures.

On December 13, 1922, special disinfection measures were ordered to be enforced at Cuban ports against arrivals from certain countries, including Hawaii and the Philippine Islands.

GREECE.

Cerebrospinal Meningitis—Smallpox—Typhus Fever.

Under date of January 17, 1923, cerebrospinal meningitis and typhus fever were reported present in sporadic form at Leucadia, Prevesa, and Zante, Greece. On the same date smallpox was reported in epidemic form.

¹ Public Health Reports, Jan. 12, 1923, p. 87.

GUADELOUPE (WEST INDIES).**"Alastrim" or Kaffir Pox—Basse Terre.**

Under date of January 13, 1923, "alastrim" or Kaffir pox was reported present at Basse Terre, Guadeloupe, West Indies, with 33 cases in hospital. The disease was stated to have reached Basse Terre about November 7, 1922.¹

POLAND.**Communicable Diseases—October 29–November 4, 1922.**

Communicable diseases have been notified in Poland as follows:

October 29–November 4, 1922.

Disease.	Cases.	Deaths. ^a	Localities of highest mortality.
Cerebrospinal meningitis.....	10	9	Lodz; Warsaw City.
Diphtheria.....	109	12	Lemberg; Posen; Volhynia.
Measles.....	449	21	Lwow; Stanislawow; Warsaw City.
Scarlet fever.....	337	40	Lwow; Warsaw City.
Smallpox.....	6	—	—
Tuberculosis.....	82	132	Lodz; Lwow; Warsaw City.
Typhoid fever.....	475	30	Lodz; Warsaw City.
Typhus fever.....	132	11	Lwow; Nowogrodek.
Typhus fever, recurrent.....	207	4	Nowogrodek.
Whooping cough.....	169	17	Stanislawow.

^a Total mortality from all causes, 330; population, estimated, 27,500,500.

Dysentery.

During the same period 64 cases of dysentery with 10 deaths were reported in Poland, the highest mortality being reported in the districts of Krakow, Lublin, and Nowogrodek.

UNION OF SOUTH AFRICA.**Smallpox—Typhus Fever—November, 1922.**

During the month of November, 1922, smallpox and typhus fever were reported in the Union of South Africa as follows: *Smallpox*.—12 cases among the colored population; 4 cases among the white population. *Typhus fever*.—1,100 cases, 107 deaths, colored population; among the white population, 3 cases with 1 death. (For distribution of occurrence according to States of the Union, see p. 226.)

Typhoid Fever Outbreak—Frere—Natal.

A sudden and virulent outbreak of typhoid fever was reported during the week ended November 25, 1922, among the boarders and staff of St. John's School, Frere, Estcourt district, Natal, with 52 cases (39 in pupils, 13 in members of staff), in a total of 50 pupils and 21 staff in the main school.

¹ Public Health Reports, Jan. 26, 1923, p. 174.

February 2, 1923.

VIRGIN ISLANDS.**Disease Prevalence—December, 1922.**

Prevalence of disease has been reported in the Virgin Islands as follows:

December, 1922.

Island and disease.	Cases.	Remarks.
St. Thomas and St. John:		
Chancroid.....	4	Imported, 3.
Chicken pox.....	1	
Dengue.....	5	
Dysentery.....	1	Unclassified.
Gonococcus infection.....	5	Imported, 4.
Syphilis.....	3	Imported, 2.
Trachoma.....	2	
St. Croix:		
Chicken pox.....	25	
Dengue.....	1	
Filariasis.....	2	Bancrofti.
Gonococcus infection.....	3	Imported, 2.
Tuberculosis.....	2	Chronic pulmonary.

CHOLERA, PLAGUE, SMALLPOX, TYPHUS FEVER, AND YELLOW FEVER.

The reports contained in the following tables must not be considered as complete or final, either as regards the list of countries included or the figures for the particular countries for which reports are given.

Reports Received During Week Ended February 2, 1923.¹**CHOLERA.**

Place.	Date.	Cases.	Deaths.	Remarks.
India:				
Calcutta.....	Dec. 3-9.....	16	9	
Madras.....	Dec. 10-16.....	1	1	
Rangoon.....	Nov. 26-Dec. 9.....	9	6	

PLAQUE.

Azores:				
Fayal Island— Castelo Branco.....	Dec. 30.....			Several cases reported present.
British East Africa:				
Tanganyika Territory.....	Oct. 29-Nov. 18.....	1	4	
Ceylon:				
Colombo.....	Dec. 3-9.....	7	2	
China:				
Hongkong.....	Nov. 13-19.....	3	1	
Egypt:				
Province—Assiout.....	Dec. 12.....	1	1	Jan. 1-Dec. 28, 1922: Cases, 485; deaths, 228. Septicemic.
India:				
Bombay.....	Nov. 26-Dec. 2.....	8	6	
Karachi.....	Dec. 10-16.....	1	1	
Madras Presidency.....	do.....	451	280	
Rangoon.....	Nov. 26-Dec. 9.....	10	10	
Java:				
East Java—Soerabaya.....	Nov. 12-18.....	8	8	
Toeloeng-Agoeng.....	Oct. 29-Nov. 11.....	17	17	Not a seaport.

SMALLPOX.

Arabia:				
Aden.....	Dec. 17-23.....		1	
British East Africa:				
Tanganyika Territory.....	Oct. 29-Nov. 18.....	161	7	
Uganda.....	Sept. 1-30.....	1	1	
Canada:				
Ontario—Ottawa.....	Jan. 7-13.....	8		
Ceylon:				
Colombo.....	Dec. 3-9.....	2		

¹ From medical officers of the Public Health Service, American consuls, and other sources.

CHOLERA, PLAGUE, SMALLPOX, TYPHUS FEVER, AND YELLOW FEVER—Continued.
Reports Received During Week Ended February 2, 1923—Continued.
SMALLPOX—Continued.

Place.	Date.	Cases.	Deaths.	Remarks.
China:				
Amoy.....	Dec. 10-16.....			Present.
Chungking.....	do.....			Do.
Foochow.....	do.....			Do.
Manchuria—				
Mukden.....	do.....			Do.
Dominican Republic:				
Puerto Plata.....	Dec. 24-30.....	1		
Great Britain:				
London.....	Dec. 17-23.....	2		
Nottingham.....	Dec. 3-9.....	1		
Greece:				
Zante.....	Jan. 17.....			Epidemic.
India:				
Bombay.....	Nov. 26-Dec. 2.....	2	2	
Calcutta.....	Dec. 3-9.....	4	3	
Karachi.....	Dec. 10-16.....	1		
Madras.....	Dec. 10-16.....	12	6	
Rangoon.....	Nov. 26-Dec. 9.....	4		
Java:				
West Java—				
Batavia.....	Nov. 25-Dec. 1.....	2		
Mexico:				
Guadalajara.....	Dec. 1-31.....	4		
Poland:				
Lisbon.....	Dec. 17-30.....	78		
Oporto.....	Dec. 24-30.....	2	1	
Spain:				
Huelva.....	Nov. 24-30.....		1	
Switzerland:				
Berne.....	Dec. 17-23.....	32		
Syria:				
Aleppo.....	Dec. 24-30.....			Present.
Turkey:				
Constantinople.....	Dec. 10-16.....	49	9	
Union of South Africa.....				Nov. 1-30, 1922: Cases, 12 (colored); white population, cases, 4.
Cape Province.....				Nov. 1-30, 1922: Cases, 12 (colored); white, 4.
Do.....	Nov. 19-Dec. 2.....			Outbreaks.

TYPHUS FEVER.

Chile:				
Talcahuano.....	Dec. 17-23.....	2		
Greece:				
Leucadia.....	Jan. 17.....			Present.
Prevesa.....	do.....			Do.
Zante.....	do.....			Do.
Palestine:				
Jerusalem.....	Dec. 26-Jan. 1.....	1		
Poland				Oct. 29-Nov. 4, 1922: Cases, 132; deaths, 11. Recurrent typhus: Cases, 207; deaths, 4.
Rumania:				
Chisinau.....	Nov. 1-30.....	5		Nov. 1-30, 1922: Cases 1,100; deaths, 107 (colored); cases, 3, deaths 1 (white).
Union of South Africa.....				Nov. 1-30, 1922: Cases, 982; deaths, 89 (colored); cases, 1, deaths, 1 (white).
Cape Province.....				Outbreaks.
Do.....	Nov. 19-25.....			Nov. 1-30, 1922: Cases, 62; deaths, 14 (colored); white, 1 case.
Natal.....				Boys' school Estcourt district; among pupils and staff.
Frere.....	Nov. 19-25.....	52		Nov. 1-30, 1922: Cases, 39; deaths, 2, (colored); white, 1 case.
Orange Free State.....				Outbreaks.
Do.....	Nov. 19-25.....			Nov. 1-30, 1922: Cases, 17; deaths, 5.
Transvaal.....				Outbreaks.
Do.....	Nov. 19-25.....			

February 2, 1923.

CHOLERA, PLAGUE, SMALLPOX, TYPHUS FEVER, AND YELLOW FEVER—Continued.
Reports Received from December 30, 1922, to January 26, 1923.¹
CHOLERA.

Place.	Date.	Cases.	Deaths.	Remarks.
China:				
Liutaoku.....	Sept. 22.....	60.....	30.....	
Chosen (Korea):				
Yaho River Region.....				
India.....				
Bombay.....	Oct. 27-Nov. 4.....	1.....	.....
Calcutta.....	Nov. 12-Dec. 2.....	34.....	21.....	
Madras.....	Nov. 19-Dec. 9.....	3.....	1.....	
Rangoon.....	Nov. 12-25.....	5.....	3.....	
Philippine Islands:				
Province—				
Laguna.....	Oct. 12-18.....	1.....	.....
Russia.....				
Archangel (government).....	Oct. 1-7.....	7.....	.....
Tashkent.....	do.....	27.....	.....
Ukraine.....				
Donez (Government).....	Sept. 1-30.....	29.....	.....
Tchernigov (Government).....	do.....	35.....	.....
Siam:				
Bangkok.....	Oct. 29-Nov. 4.....	1.....	.....

PLAQUE.

Azores:				
Fayal Island—				
Castelo Branco.....	Dec. 2.....	.....	2.....	Vicinity of Horta.
Pico Island—				
Lages.....	Nov. 27-Dec. 15.....	.....	8.....	
St. Michael's Island.....				
Ponta Delgada.....	Nov. 26-Dec. 9.....	.....	3.....	1 case present Dec. 15, 1922. Nov. 12-Dec. 9, 1922: Cases, 66; deaths, 24. At localities 3-9 miles from Ponta Delgada.
Brazil:				
Bahia.....	Oct. 29-Nov. 18.....	1.....	1.....	
Porto Alegre.....	Nov. 19-25.....	1.....	.....
British East Africa:				
Kenya Colony—				
Tanganyika Territory.....	Oct. 15-21.....	.....	1.....	
Ceylon:				
Colombo.....	Nov. 12-Dec. 2.....	13.....	9.....	Plague rodents, 5.
China:				
Hongkong.....	Nov. 5-Dec. 2.....	9.....	8.....	
Ecuador:				
Guayaquil.....	Nov. 1-Dec. 15.....	1.....	1.....	Rats examined, 12,850; found in- fected, 58.
Egypt:				
City—				
Alexandria.....	Nov. 19-25.....	.....	2.....	
Port Said.....	Nov. 19-27.....	4.....	2.....	
Suez.....	Nov. 18-Dec. 5.....	3.....	4.....	
Province—				
Assiout.....	Nov. 19.....	1.....	.....
Dakahlieh.....	Dec. 3.....	1.....	1.....	Pneumonic.
Minieh.....	Nov. 18-27.....	2.....	1.....	
India.....				
Bombay.....	Oct. 27-Nov. 25.....	22.....	19.....	Oct. 1-Nov. 11, 1922: Cases, 10,644; deaths, 8,636.
Madras Presidency.....	Nov. 19-Dec. 9.....	1,044.....	692.....	
Madras.....	Nov. 19-25.....	1.....	1.....	
Rangoon.....	Nov. 12-25.....	16.....	15.....	
Japan:				
Osaka.....				
Java:				
East Java—				
Soerabaya.....	Oct. 22-28.....	1.....	1.....	July 1-Nov. 30, 1922: Cases, 70. Oct. 1-31, 1922: Cases, 454; deaths, 338.
Soerakarta—				
Klaten.....	Nov. 4.....	.....	.....	Present in epidemic form.

¹ From medical officers of the Public Health Service, American consuls, and other sources.

CHOLERA, PLAGUE, SMALLPOX, TYPHUS FEVER, AND YELLOW FEVER—Continued.
Reports Received from December 30, 1922, to January 26, 1923—Continued.
PLAGUE—Continued.

Place.	Date.	Cases.	Deaths.	Remarks.
Madagascar:				
Province—				
Moramanga.....				To Oct. 30, 1922: Cases, 21; deaths, 18. Pneumonic.
Tananarive.....				To Oct. 30, 1922: Cases, 7; deaths, 7. Septicemic. Occurring in Fenoarivo region. (See Public Health Reports, Dec. 29, 1922, p. 3237.)
Do.....	Oct. 23-29.....		1	Septicemic.
Mesopotamia:				
Bagdad.....	Oct. 1-31.....	7		
Palestine:				
Jaffa.....	Nov. 27-Dec. 4.....	1		
Peru:				Nov. 1-30, 1922: Cases, 83; deaths, 42.
Localities—				
Cafete.....	Nov. 16-30.....	16	7	
Chepen.....	Nov. 1-15.....			Present.
Chiclayo.....	Nov. 16-30.....	11	7	
Eten.....	do.....	3		
Guadalupe.....	Nov. 1-30.....	11	5	
Huacho.....	Nov. 16-30.....	2	1	
Huáral.....	do.....	1		
Jayanca.....	do.....	3	2	
Lambayeque.....	do.....	5	3	
Lima (Suburb).....	Nov. 1-30.....	6	1	
Lima (City).....	do.....	3	3	
Magdalena del Mar.....	Nov. 16-30.....	1		
Mosche.....	do.....	2	1	
Piura.....	do.....	8	5	
San Pedro.....	Nov. 1-30.....	5	3	
Sullana.....	Nov. 16-30.....	3	3	
Trujillo.....	Nov. 1-15.....		1	
Tuman.....	Nov. 16-30.....	3		
Portugal:				
Lisbon.....	Nov. 10-29.....	4	2	
Portuguese West Africa:				
Angola—				
Loanda.....	Oct. 1-28.....		27	Fatal cases among white population.
Siam:				
Bangkok.....	Nov. 12-18.....	2	1	
Spain:				
Barcelona.....	Nov. 15-Dec. 18.....	1		Sept. 24-Nov. 14, 1922: Cases, 23; deaths, 9.
Syria:				
Beirut.....	Nov. 6-12.....	2	1	
Turkey:				
Constantinople.....	Nov. 22-28.....	2		

SMALLPOX.

Algeria:				
Algiers.....	Dec. 1-10.....	1		
Arabia:				
Aden.....	Nov. 19-Dec. 16.....	7	2	
Brazil:				
Bahia.....	Nov. 5-11.....	1		
Rio de Janeiro.....	Nov. 25-Dec. 16.....	27	5	
Sao Paulo.....	Oct. 16-22.....	1	1	
British East Africa:				
Kenya Colony—				
Tanganyika Territory..	Oct. 8-28.....	12	2	
Canada:				
Manitoba—				
Winnipeg.....	Dec. 10-30.....	14		
Ontario.....	Dec. 31-Jan. 6.....	2		Dec. 1-31, 1922: Cases, 51; deaths, 1.
Hamilton.....	Dec. 3-30.....	10		
Niagara Falls.....	Dec. 31-Jan. 6.....	5		
Do.....	Dec. 10-23.....	6		
Ottawa.....	Dec. 10-30.....	2		
Toronto.....	Dec. 10-30.....	2		
Saskatchewan—				
Regina.....	Dec. 3-23.....	2		

February 2, 1923.

CHOLERA, PLAGUE, SMALLPOX, TYPHUS FEVER, AND YELLOW FEVER—Continued.
Reports Received from December 30, 1922, to January 26, 1923—Continued.
SMALLPOX—Continued.

Place.	Date.	Cases.	Deaths.	Remarks.
Ceylon:				
Colombo.....	Nov. 12-Dec. 2.....	6	3	
Chile:				
Concepcion.....	Oct. 30-Nov. 20.....		3	
Valparaiso.....	Oct. 2-Nov. 5.....		51	
China:				
Amoy.....	Nov. 5-18.....		2	Nov. 26-Dec. 2, 1922: Present.
Antung.....	Nov. 13-Dec. 10.....	2		
Canton.....	Oct. 1-Nov. 30.....			Prevalent.
Chungking.....	Nov. 5-11.....			Present.
Foochow.....	Nov. 12-Dec. 2.....			Do.
Hongkong.....	Nov. 5-11.....		1	
Manchuria—				
Harbin.....	Nov. 20-26.....	5		
Mukden.....	Nov. 19-Dec. 2.....			Do.
Nanking.....	Nov. 5-Dec. 9.....			Do.
Chosen:				
Chemulpo.....	Oct. 1-Nov. 30.....	52	29	
Fusan.....	Nov. 1-30.....	1		
Seoul.....	Oct. 1-Nov. 30.....	6		
Czechoslovakia:				Oct. 1-31, 1922: Cases, 3.
Province—				
Bohemia.....	Oct. 1-31.....	1		
Moravia.....	do.....	1		
Slovakia.....	do.....	1		
Dominican Republic:				
Puerto Plata.....	Dec. 14-20.....	1		
Santo Domingo.....	Dec. 3-16.....			Present.
Ecuador:				
Guayaquil.....	Dec. 1-15.....	6		
France:				
Paris.....	Dec. 1-10.....	1		
Germany:				
Bremen.....	Dec. 3-9.....	1		
Great Britain:				
Liverpool.....	Dec. 11-17.....	1		From vessel.
London.....	Nov. 26-Dec. 2.....	1		
Greece:				
Saloniki.....	Nov. 6-Dec. 10.....	3	1	
India:				Nov. 5-18, 1922: Cases, 1,390; deaths, 276.
Bombay.....	Nov. 5-25.....	3	3	
Calcutta.....	Nov. 12-Dec. 2.....	13	8	
Karachi.....	Nov. 26-Dec. 9.....	3		
Madras.....	Nov. 12-Dec. 9.....	31	15	
Rangoon.....	Nov. 5-25.....	5	2	
Java:				
East Java—				
Soerabaya.....	Nov. 5-11.....	4		
West Java—				
Batavia.....	Nov. 11-17.....	21		Province.
Mesopotamia:				
Bagdad.....	Oct. 1-31.....	285	153	
Mexico:				
Chihuahua.....	Dec. 4-17.....		4	
Mexico City.....	Nov. 12-Dec. 16.....	31		Including municipalities in Federal District.
Nogales.....	Dec. 10-19.....		1	
Do.....	Dec. 31-Jan. 6.....		1	
Sonora, State:				
Empalme.....	Nov. 1-30.....	4	1	
Torreon.....	Dec. 1-31.....		1	
Peru:				
Callao.....	Nov. 1-15.....	2		
Lima (country).....	do.....	2	1	
Poland.....				Oct. 1-28, 1922: Cases, 48; deaths, 14.
Portugal:				
Lisbon.....	Nov. 19-Dec. 16.....	65	6	
Oporto.....	Oct. 15-Dec. 23.....	22	11	
Russia:				
Province—				
Estonia.....	Oct. 1-Nov. 30.....	42		
Lettonia.....	Oct. 1-31.....	1		
Ukraine.....				Jan.-Sept., 1922: Cases, 8,714.

CHOLERA, PLAGUE, SMALLPOX, TYPHUS FEVER, AND YELLOW FEVER—Continued.
Reports Received from December 30, 1922, to January 26, 1923—Continued.
SMALLPOX—Continued.

Place.	Date.	Cases.	Deaths.	Remarks.
Spain:				
Corunna.....	Nov. 26-Dec. 2.....		1	
Seville.....	Nov. 27-Dec. 17.....		24	
Valencia.....	Nov. 26-Dec. 23.....	3		
Switzerland:				
Berne.....	Nov. 19-Dec. 9.....	39		
Zurich.....	Nov. 19-Dec. 2.....	14		
Syria:				
Aleppo.....	Nov. 19-Dec. 23.....	38	20	Dec. 3-9, 1922: Present.
Damascus.....	Nov. 1-30.....	82	16	
Tunis:				
Tunis.....	Dec. 1-22.....	2	1	
Turkey:				
Constantinople.....	Nov. 19-Dec. 9.....	73	23	
Union of South Africa.....				Oct. 1-31, 1922: Cases, 17. Natives.
Cape Province.....				Oct. 1-31, 1922: Cases, 9. Outbreaks.
Do.....	Oct. 29-Nov. 18.....			
Southern Rhodesia.....	Nov. 9-15.....	3		
Transvaal.....				Oct. 1-31, 1922: Cases, 8. Outbreaks.
Do.....	Oct. 29-Nov. 4.....			
Yugoslavia:				
Serbia—				
Belgrade.....	Nov. 12-18.....	2	1	
On vessel:				
S. S. Huntress.....	Nov. 11.....	1		At Fremantle, Australia, from Cape Town, South Africa.
—	Dec. 17-23.....	1		At Liverpool.

TYPHUS FEVER.

Algeria:				
Algiers.....	Nov. 11-20.....	1	1	
Brazil:				
Porto Alegre.....	Nov. 19-Dec. 16.....	3		
Chile:				
Antofagasta.....	Nov. 12-Dec. 23.....	21	5	Nov. 11-Dec. 5, 1922: Cases, 10; deaths, 2.
Concepcion.....	Oct. 17-Nov. 27.....		8	
Talcahuano.....	Nov. 12-Dec. 16.....	8	6	
China:				
Antung.....	Nov. 13-Dec. 10.....	7		
Manchuria—				
Harbin.....	Nov. 20-26.....	7		
Cuba:				
Matanzas.....	Dec. 25-31.....	1	1	
Czechoslovakia:				
City—				
Prague.....	Nov. 19-25.....	1		
Province—				
Ruthenia.....	Oct. 1-31.....	1		
Egypt:				
Alexandria.....	Nov. 19-25.....	1	1	
Cairo.....	Oct. 1-21.....	6	4	
Germany:				
Coblenz.....	Dec. 10-16.....	1		
Dresden.....	do.....	1		
Ireland:				
Belmullet.....	June 15-Dec. 11.....	20		In county Mayo.
Mexico:				
Mexico City.....	Nov. 12-Dec. 16.....	63		Including municipalities in Federal District.
Palestine:				
Jaffa.....	Dec. 12-18.....	2		Dec. 5-11, 1922: Cases, 2; in northern section.
Persia:				
Teheran.....	Sept. 24-Oct. 24.....	1		
Poland.....	*			Oct. 1-28, 1922: Cases, 515; deaths, 39. Recurrent typhus: Cases, 725; deaths, 16.
Portugal:				
Oporto.....	Oct. 15-Dec. 2.....	1	1	

February 2, 1923.

CHOLERA, PLAGUE, SMALLPOX, TYPHUS FEVER, AND YELLOW FEVER—Continued.**Reports Received from December 30, 1922, to January 26, 1923—Continued.****TYPHUS FEVER—Continued.**

Place.	Date.	Cases.	Deaths.	Remarks.
Russia.....				July 30-Sept. 23, 1922: Cases, 23,803.
Estonia.....	Nov. 1-30.....	1.....		Oct. 1-Nov. 30, 1922: Recurrent typhus: Cases, 7.
Lettonia.....	Oct. 1-31.....	19.....		Recurrent typhus: Cases, 4.
Ukraine.....	Jan.-Sept.....	307,329.....		
Ukraine, Tartar Republic and Siberia.....	June 1-30.....	35,926.....		Provisional figures.
Do.....	July 1-31.....	17,262.....		Do.
Do.....	Aug. 1-31.....	6,864.....		Do.
Do.....	Sept. 1-30.....	2,388.....		Do.
Spain:				
Barcelona.....	Nov. 30-Dec. 6.....		2.....	
Syria:				
Aleppo.....	Dec. 10-16.....	1.....	1.....	
Turkey:				
Constantinople.....	Nov. 27-Dec. 2.....		3.....	
Union of South Africa.....				Oct. 1-31, 1922: Cases, 890 deaths, 78 (white—cases 4, deaths 1; colored—cases 88%, deaths 77).
Cape Province.....				Oct. 1-31, 1922: Cases, 817; deaths, 60 (colored); white—2 cases.
Do.....	Oct. 29-Nov. 18.....			Outbreaks.
Natal.....				Oct. 1-31, 1922: Cases, 45; deaths, 13 (colored); white—1 case.
Orange Free State.....				Oct. 1-31, 1922: Cases, 19; deaths, 4 (colored); white—1 case, 1 death.
Do.....	Nov. 12-18.....			Outbreaks.
Transvaal.....	Oct. 29-Nov. 18.....			Oct. 1-31, 1922: Cases, 5 (colored).
Do.....				Outbreaks.

YELLOW FEVER.

West Africa:				
Senegal—				
Saltpond.....				Reported present Dec. 21, 1922.
Warrai.....				Do.

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